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# APPENDIX A

## *Calculation of weighted mean atomic number ($\bar{Z}$) and backscattered-electron coefficient ($\bar{\eta}$)*

The backscattered-electron coefficient for pure elements can be approximated by the following empirical formula: $\eta=0.5-0.228*10^{-4}(80-Z)*(|80-Z|)^{1.3}$ where $Z$ is the atomic number of the element (Heinrich, 1981). For a multicomponent target, such as a mineral, the weighted mean backscattered-electron coefficient , $\bar{\eta}$, is used where $\bar{\eta} = \Sigma C_i \eta_I$ and $C_i$ is the weight fraction of element $i$ in the mineral, and $\eta_i$ is the backscattered-electron coefficient of element $i$.

Weighted mean atomic number $\bar{Z}=\Sigma C_i Z_i$. For comparison with $\bar{\eta}$ this value can is divided by 100.

By way of illustration $\bar{Z}$ and $\bar{\eta}$ is calculated for pyrite with composition $FeS_2$ (Table 1).

***Table 1*** *Calculation of weighted mean atomic number ($\bar{Z}$) and backscattered-electron coefficient ($\bar{\eta}$) for pyrite with composition $FeS_2$.*

| ***i*** | ***Fe*** | ***S*** |
|---|---|---|
| $Z$ | 26 | 16 |
| $\eta$ | 0.28 | 0.18 |
| $C_i$ | 0.47 | 0.53 |
| $C_i\eta_i$ | 0.13 | 0.09 |
| $\bar{\eta}$ | 0.22 | |
| $C_iZ_i$ | 12.10 | 8.55 |
| $\bar{Z}/100$ | 0.21 | |

# APPENDIX B

*Ideal chemical formulaE and densities of minerals in UG2 chromitite ( Hurlbut & Klein,1977; Cabri, 1981; Deer et al.; 1983).*

| Mineral name | Ideal chemical formula | Density |
|---|---|---|
| Pentlandite | $(Fe,Ni)_9S_8$ | 4.6-5.0 |
| Pyrrhotite | $Fe_{1-x}S$ | 4.58-4.65 |
| Pyrite | $FeS_2$ | 5.02 |
| Millerite | NiS | 5.5±0.2 |
| Chalcopyrite | $CuFeS_2$ | 4.1-4.3 |
| Galena | PbS | 7.4-7.6 |
| Braggite | $Pt_{0.64}Pd_{0.27}Ni_{0.14}S_{1.00}$ | 9.34 |
| Cooperite | PtS | 10.12 |
| Vysotskite | PdS | 6.71 |
| Laurite | $(Ru,Os,Ir)S_2$ | 6.22 |
| Malanite | $Cu(Pt,Rh)_2S_4$ | 7.4 |
| Pt-Fe alloy | $Pt_3Fe$ | 18.23 |
| Chromite | $(Fe,Mg)Cr_2O_4$ | 4.6 |
| Talc | $Mg_3Si_4O_{10}(OH)_2$ | 2.7-2.8 |
| Bronzite | $(Mg,Fe)SiO_3$ | 3.3 |
| Anorthite | $CaAl_2Si_2O_8$ | 2.76 |
| Albite | $NaAlSi_3O_8$ | 2.62 |
| Quartz | $SiO_2$ | 2.65 |
| Calcite | $CaCO_3$ | 2.71 |
| Pumpellyite | $Ca_4(Mg,Fe)(Al,Fe)_5(OH)_3[Si_2O_7]_2[SiO_4]_2.2H_2O$ | 3.18-3.23 |
| Chlorite | $(Mg,Fe)_3(Si,Al)_4O_{10}(OH)_2.(Mg,Fe)_3(OH)_6$ | 3.1-3.2 |
| Prehnite | $Ca_2Al(AlSi_3O_{10})(OH)_2$ | 2.8-2.95 |
| Epidote | $Ca_2(Al,Fe)Al_2O(SiO_4)Si_2O_7(OH)$ | 3.35-3.45 |
| Phlogopite | $KMg_3(AlSi_3O_{10})(OH)_2$ | 2.86 |

# APPENDIX C

*Chromite grain-size measurements.*

***Table 1*** *Measured chromite grain-size distributions for 15 polished sections of crushed sample A1, expressed as area percentage in 13 size classes.*

| Diameter | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***0-48 µm*** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| ***48-101 µm*** | 18 | 17 | 15 | 16 | 15 | 17 | 17 | 17 | 17 | 14 | 18 | 17 | 16 | 15 | 18 |
| ***101-155 µm*** | 27 | 29 | 26 | 26 | 26 | 26 | 27 | 28 | 27 | 27 | 27 | 28 | 26 | 25 | 2 |
| ***155-208 µm*** | 25 | 23 | 23 | 23 | 22 | 22 | 23 | 22 | 23 | 24 | 21 | 24 | 25 | 22 | 22 |
| ***208-262 µm*** | 13 | 15 | 16 | 16 | 17 | 16 | 16 | 15 | 15 | 17 | 15 | 16 | 15 | 15 | 16 |
| ***262-315 µm*** | 11 | 8 | 10 | 10 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 6 | 9 | 11 | 8 |
| ***315-368 µm*** | 3 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 3 |
| ***368-422 µm*** | 1 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 3 | 1 | 2 | 3 | 1 |
| ***422-475 µm*** | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ***475-529 µm*** | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| ***529-582 µm*** | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| ***582-636 µm*** | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| ***>636 µm*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| ***Median (µm)*** | 164 | 160 | 173 | 170 | 171 | 168 | 166 | 165 | 166 | 171 | 165 | 163 | 170 | 174 | 160 |

Average measured median chromite size: **167 µm**

Using resampling statistics it was determined that measurements on five polished sections (± 15 000 chromite grains) would provide an average value for the median chromite grain-size between 163 and 170 µm, i.e. a relative error of ~2% (95% confidence level).

***Table 2*** *Measured chromite grain-size distributions for 12 traverses on a polished section of milled feed of sample A1, expressed as area percentage in 13 size classes.*

| **Traverse no.** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** | ***9*** | ***10*** | ***11*** | ***12*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No. grains** | ***3068*** | ***2990*** | ***2985*** | ***2855*** | ***2988*** | ***2998*** | ***2948*** | ***2968*** | ***2980*** | ***2915*** | ***2887*** | ***2843*** |
| ***0-17 µm*** | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6 |
| ***17-36 µm*** | 25 | 26 | 25 | 25 | 23 | 25 | 25 | 24 | 25 | 27 | 27 | 26 |
| ***36-55 µm*** | 26 | 24 | 25 | 27 | 28 | 25 | 29 | 27 | 27 | 27 | 25 | 24 |
| ***55-74 µm*** | 22 | 20 | 21 | 21 | 22 | 21 | 21 | 23 | 22 | 20 | 20 | 23 |
| ***74-94 µm*** | 13 | 15 | 15 | 12 | 14 | 14 | 13 | 15 | 15 | 13 | 12 | 16 |
| ***94-113 µm*** | 6 | 6 | 7 | 6 | 6 | 8 | 6 | 5 | 5 | 6 | 8 | 4 |
| ***113-132 µm*** | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 2 |
| ***132-151 µm*** | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| ***151-170 µm*** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***170-189 µm*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***189-208 µm*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***208-227 µm*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***>227 µm*** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| ***Median ECD (µm)*** | 50 | 51 | 51 | 50 | 51 | 52 | 49 | 51 | 50 | 49 | 49 | 50 |

Average measured median chromite size: **50 µm**

Using resampling statistics it was determined that measurements along two traverses of a polished section (± 5 000 chromite grains) would provide an average value for the median chromite grain-size between 49 and 51 µm, i.e. a relative error of <2% (95% confidence level).

# APPENDIX D

*Electron microprobe analyses of selected chromite grains in samples A1, A4, B4 and C1. All analyses were performed in duplicate and are reported as mass % oxide. The number of cations was calculated on the basis of 32 oxygen anions. $Fe^{2+}$:$Fe^{3+}$ ratios were calculated on the assumption of stoichiometry. Analytical conditions and minimum detection limits are discussed in Chapter 3.*

***Table 1*** *Electron-microprobe analyses of selected chromite grains in sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.83 | 0.84 | 0.87 | 0.84 | 0.86 | 0.84 | 0.80 | 0.84 | 0.85 | 0.90 | 0.89 | 0.87 |
| $V_2O_3$ | 0.25 | 0.28 | 0.28 | 0.33 | 0.30 | 0.35 | 0.30 | 0.32 | 0.34 | 0.31 | 0.33 | 0.32 |
| $Al_2O_3$ | 16.59 | 16.61 | 16.81 | 16.95 | 17.00 | 16.76 | 16.76 | 16.60 | 16.75 | 17.40 | 16.63 | 16.71 |
| $Cr_2O_3$ | 42.53 | 42.47 | 42.06 | 42.06 | 42.13 | 42.38 | 42.45 | 42.68 | 42.62 | 41.25 | 41.94 | 41.93 |
| $Fe_2O_3$ | 9.58 | 9.56 | 9.72 | 9.62 | 9.47 | 9.35 | 9.28 | 9.25 | 9.38 | 9.94 | 9.94 | 9.83 |
| FeO | 19.29 | 19.34 | 19.21 | 19.16 | 19.27 | 19.47 | 19.56 | 19.53 | 19.46 | 19.40 | 19.56 | 19.40 |
| MnO | 0.25 | 0.28 | 0.26 | 0.26 | 0.26 | 0.26 | 0.27 | 0.26 | 0.26 | 0.27 | 0.26 | 0.25 |
| NiO | 0.16 | 0.16 | 0.17 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.17 | 0.16 | 0.15 |
| CoO | 0.00 | 0.05 | 0.04 | 0.01 | 0.05 | 0.04 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.03 |
| $Cu_2O$ | 0.03 | 0.01 | 0.02 | 0.00 | 0.07 | 0.01 | 0.00 | 0.02 | 0.01 | 0.00 | 0.06 | 0.03 |
| ZnO | 0.10 | 0.07 | 0.08 | 0.11 | 0.10 | 0.01 | 0.07 | 0.07 | 0.14 | 0.11 | 0.04 | 0.03 |
| MgO | 9.56 | 9.51 | 9.62 | 9.69 | 9.57 | 9.49 | 9.41 | 9.42 | 9.50 | 9.60 | 9.41 | 9.51 |
| Total | 99.03 | 99.05 | 99.00 | 99.03 | 99.09 | 98.96 | 98.91 | 99.01 | 99.32 | 99.21 | 99.07 | 98.93 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | |
| Ti | 0.16 | 0.16 | 0.17 | 0.16 | 0.17 | 0.16 | 0.16 | 0.17 | 0.17 | 0.18 | 0.17 | 0.17 |
| V | 0.05 | 0.06 | 0.06 | 0.07 | 0.06 | 0.07 | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Al | 5.11 | 5.12 | 5.17 | 5.21 | 5.22 | 5.16 | 5.17 | 5.12 | 5.14 | 5.33 | 5.13 | 5.15 |
| Cr | 8.79 | 8.78 | 8.68 | 8.67 | 8.69 | 8.76 | 8.78 | 8.83 | 8.78 | 8.48 | 8.67 | 8.67 |
| $Fe^{3+}$ | 1.89 | 1.88 | 1.91 | 1.89 | 1.86 | 1.84 | 1.83 | 1.82 | 1.84 | 1.94 | 1.96 | 1.94 |
| $Fe^{2+}$ | 4.22 | 4.23 | 4.20 | 4.18 | 4.20 | 4.26 | 4.28 | 4.27 | 4.24 | 4.22 | 4.28 | 4.24 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Ni | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 |
| Co | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Cu | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| Zn | 0.02 | 0.01 | 0.01 | 0.02 | 0.02 | 0.00 | 0.01 | 0.01 | 0.03 | 0.02 | 0.01 | 0.01 |
| Mg | 3.73 | 3.71 | 3.74 | 3.77 | 3.72 | 3.70 | 3.67 | 3.68 | 3.69 | 3.72 | 3.67 | 3.71 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.05 | 8.06 | 8.06 | 8.06 |

***Table 1 continued*** *Electron-microprobe analyses of selected chromite grains in sample A1.*

| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.87 | 0.87 | 0.99 | 0.98 | 0.97 | 0.98 | 0.97 | 0.96 | 0.96 | 0.97 | 0.93 | 0.89 |
| $V_2O_3$ | 0.30 | 0.35 | 0.38 | 0.46 | 0.39 | 0.41 | 0.44 | 0.37 | 0.45 | 0.43 | 0.34 | 0.42 |
| $Al_2O_3$ | 16.65 | 16.59 | 15.31 | 15.45 | 15.27 | 15.39 | 15.44 | 15.35 | 15.25 | 15.33 | 15.35 | 15.41 |
| $Cr_2O_3$ | 41.81 | 42.42 | 44.49 | 44.18 | 44.45 | 44.48 | 44.53 | 44.41 | 44.43 | 44.45 | 44.21 | 44.57 |
| $Fe_2O_3$ | 10.01 | 9.57 | 8.71 | 8.73 | 8.70 | 8.56 | 8.54 | 8.61 | 8.79 | 8.74 | 8.69 | 8.45 |
| FeO | 19.32 | 19.45 | 19.74 | 19.83 | 19.72 | 19.87 | 19.66 | 19.83 | 19.78 | 19.73 | 19.88 | 19.87 |
| MnO | 0.26 | 0.26 | 0.27 | 0.26 | 0.28 | 0.27 | 0.26 | 0.28 | 0.27 | 0.27 | 0.26 | 0.26 |
| NiO | 0.15 | 0.15 | 0.12 | 0.10 | 0.13 | 0.13 | 0.10 | 0.12 | 0.10 | 0.12 | 0.13 | 0.12 |
| CoO | 0.05 | 0.00 | 0.03 | 0.01 | 0.06 | 0.01 | 0.00 | 0.03 | 0.00 | 0.02 | 0.02 | 0.02 |
| $Cu_2O$ | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.01 | 0.12 | 0.00 | 0.00 | 0.02 | 0.02 | 0.01 |
| ZnO | 0.04 | 0.05 | 0.03 | 0.07 | 0.09 | 0.07 | 0.07 | 0.06 | 0.11 | 0.09 | 0.08 | 0.12 |
| MgO | 9.53 | 9.52 | 9.23 | 9.16 | 9.14 | 9.12 | 9.23 | 9.11 | 9.16 | 9.20 | 9.04 | 9.09 |
| Total | 98.85 | 99.09 | 99.14 | 99.13 | 99.07 | 99.15 | 99.23 | 98.99 | 99.16 | 99.24 | 98.79 | 99.09 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | |
| Ti | 0.17 | 0.17 | 0.20 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 |
| V | 0.06 | 0.07 | 0.08 | 0.10 | 0.08 | 0.09 | 0.09 | 0.08 | 0.09 | 0.09 | 0.07 | 0.09 |
| Al | 5.14 | 5.11 | 4.75 | 4.79 | 4.74 | 4.77 | 4.78 | 4.77 | 4.73 | 4.75 | 4.78 | 4.78 |
| Cr | 8.66 | 8.76 | 9.25 | 9.19 | 9.26 | 9.25 | 9.25 | 9.25 | 9.24 | 9.24 | 9.24 | 9.28 |
| $Fe^{3+}$ | 1.97 | 1.88 | 1.72 | 1.73 | 1.72 | 1.69 | 1.69 | 1.71 | 1.74 | 1.73 | 1.73 | 1.67 |
| $Fe^{2+}$ | 4.23 | 4.25 | 4.34 | 4.36 | 4.34 | 4.37 | 4.32 | 4.37 | 4.35 | 4.34 | 4.39 | 4.37 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Ni | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 | 0.03 | 0.02 |
| Co | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.03 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| Zn | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 |
| Mg | 3.72 | 3.71 | 3.62 | 3.59 | 3.59 | 3.58 | 3.61 | 3.58 | 3.60 | 3.60 | 3.56 | 3.57 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.05 | 8.06 | 8.06 | 8.05 | 8.06 | 8.05 |

***Table 1 continued*** *Electron-microprobe analyses of selected chromite grains in sample A1.*

| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.97 | 0.96 | 0.73 | 0.76 | 0.76 | 0.77 | 0.78 | 0.77 | 0.75 | 0.77 | 0.74 | 0.73 |
| $V_2O_3$ | 0.36 | 0.44 | 0.32 | 0.34 | 0.28 | 0.29 | 0.24 | 0.22 | 0.32 | 0.23 | 0.26 | 0.30 |
| $Al_2O_3$ | 15.35 | 15.38 | 17.64 | 17.82 | 18.03 | 17.98 | 18.26 | 18.11 | 18.41 | 18.32 | 17.99 | 18.35 |
| $Cr_2O_3$ | 44.18 | 44.21 | 42.54 | 42.30 | 42.34 | 42.24 | 41.84 | 41.94 | 41.75 | 41.59 | 42.24 | 41.99 |
| $Fe_2O_3$ | 8.77 | 8.70 | 8.56 | 8.59 | 8.41 | 8.52 | 8.64 | 8.49 | 8.56 | 8.80 | 8.59 | 8.54 |
| FeO | 19.91 | 19.76 | 18.71 | 18.64 | 18.65 | 18.62 | 18.60 | 18.69 | 18.56 | 18.47 | 18.55 | 18.39 |
| MnO | 0.27 | 0.28 | 0.26 | 0.26 | 0.26 | 0.26 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| NiO | 0.12 | 0.13 | 0.16 | 0.15 | 0.15 | 0.14 | 0.15 | 0.14 | 0.14 | 0.16 | 0.15 | 0.14 |
| CoO | 0.00 | 0.04 | 0.00 | 0.02 | 0.02 | 0.03 | 0.03 | 0.01 | 0.02 | 0.01 | 0.02 | 0.04 |
| $Cu_2O$ | 0.01 | 0.03 | 0.06 | 0.01 | 0.02 | 0.01 | 0.00 | 0.02 | 0.03 | 0.01 | 0.01 | 0.00 |
| ZnO | 0.08 | 0.11 | 0.09 | 0.09 | 0.03 | 0.08 | 0.07 | 0.06 | 0.12 | 0.06 | 0.11 | 0.15 |
| MgO | 9.06 | 9.10 | 10.01 | 10.10 | 10.15 | 10.13 | 10.17 | 10.06 | 10.20 | 10.26 | 10.17 | 10.30 |
| Total | 98.92 | 98.99 | 98.96 | 98.93 | 98.99 | 98.95 | 98.92 | 98.65 | 98.98 | 98.80 | 98.96 | 99.05 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | |
| Ti | 0.19 | 0.19 | 0.14 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.14 | 0.14 |
| V | 0.08 | 0.09 | 0.07 | 0.07 | 0.06 | 0.06 | 0.05 | 0.05 | 0.07 | 0.05 | 0.05 | 0.06 |
| Al | 4.77 | 4.78 | 5.39 | 5.44 | 5.50 | 5.49 | 5.56 | 5.54 | 5.60 | 5.58 | 5.49 | 5.58 |
| Cr | 9.22 | 9.21 | 8.73 | 8.67 | 8.66 | 8.64 | 8.55 | 8.61 | 8.52 | 8.51 | 8.64 | 8.56 |
| $Fe^{3+}$ | 1.74 | 1.73 | 1.67 | 1.67 | 1.64 | 1.66 | 1.68 | 1.66 | 1.66 | 1.71 | 1.67 | 1.66 |
| $Fe^{2+}$ | 4.39 | 4.36 | 4.06 | 4.04 | 4.03 | 4.03 | 4.02 | 4.06 | 4.01 | 3.99 | 4.02 | 3.97 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.06 | 0.06 |
| Ni | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Co | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Cu | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| Zn | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.02 | 0.03 |
| Mg | 3.56 | 3.58 | 3.87 | 3.90 | 3.91 | 3.91 | 3.92 | 3.89 | 3.93 | 3.96 | 3.92 | 3.96 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.06 | 8.06 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.06 | 8.05 | 8.05 | 8.05 | 8.05 |

***Table 1 continued*** *Electron-microprobe analyses of selected chromite grains in sample A1.*

| | 37 | 38 | 39 | 40 | 41 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.76 | 0.78 | 0.75 | 0.79 | 0.74 | 0.85 | 0.09 | 0.03 |
| $V_2O_3$ | 0.30 | 0.25 | 0.31 | 0.28 | 0.27 | 0.33 | 0.06 | 0.02 |
| $Al_2O_3$ | 17.95 | 18.28 | 18.23 | 18.23 | 18.14 | 16.85 | 1.14 | 0.36 |
| $Cr_2O_3$ | 42.29 | 41.97 | 42.11 | 42.04 | 41.85 | 42.79 | 1.08 | 0.34 |
| $Fe_2O_3$ | 8.60 | 8.56 | 8.49 | 8.47 | 8.69 | 8.95 | 0.51 | 0.16 |
| FeO | 18.49 | 18.45 | 18.57 | 18.51 | 18.47 | 19.20 | 0.53 | 0.17 |
| MnO | 0.25 | 0.26 | 0.23 | 0.25 | 0.26 | 0.26 | 0.01 | 0.00 |
| NiO | 0.16 | 0.14 | 0.14 | 0.16 | 0.15 | 0.14 | 0.02 | 0.01 |
| CoO | 0.00 | 0.01 | 0.06 | 0.00 | 0.00 | 0.02 | 0.02 | 0.01 |
| $Cu_2O$ | 0.05 | 0.02 | 0.00 | 0.05 | 0.07 | 0.02 | 0.03 | 0.01 |
| ZnO | 0.13 | 0.14 | 0.10 | 0.09 | 0.11 | 0.08 | 0.03 | 0.01 |
| MgO | 10.18 | 10.25 | 10.21 | 10.21 | 10.17 | 9.65 | 0.44 | 0.14 |
| CaO | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | 99.04 | 99.01 | 99.09 | 98.97 | 98.81 | 99.01 | 0.13 | 0.04 |
| Number of ions on the basis of 32 O | | | | | | | | |
| Ti | 0.15 | 0.15 | 0.15 | 0.15 | 0.14 | 0.17 | 0.02 | 0.01 |
| V | 0.06 | 0.05 | 0.06 | 0.06 | 0.06 | 0.07 | 0.01 | 0.00 |
| Al | 5.47 | 5.56 | 5.55 | 5.55 | 5.54 | 5.18 | 0.31 | 0.10 |
| Cr | 8.65 | 8.57 | 8.59 | 8.59 | 8.57 | 8.83 | 0.28 | 0.09 |
| $Fe^{3+}$ | 1.67 | 1.66 | 1.65 | 1.65 | 1.69 | 1.76 | 0.10 | 0.03 |
| $Fe^{2+}$ | 4.00 | 3.98 | 4.01 | 4.00 | 4.00 | 4.19 | 0.15 | 0.05 |
| Mn | 0.05 | 0.06 | 0.05 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| Ni | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| Co | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.01 | 0.01 | 0.00 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 |
| Zn | 0.03 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.00 |
| Mg | 3.92 | 3.95 | 3.93 | 3.93 | 3.93 | 3.75 | 0.14 | 0.04 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 0.00 | 0.00 |
| $\Sigma M^{2+}$ | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | | |

*$x$ = Average $s$ = standard deviation CL = 95% confidence limit*

***Table 2*** *Electron-microprobe analyses of selected sintered chromite grains in sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.94 | 0.99 | 0.94 | 1.19 | 1.13 | 1.15 | 1.04 | 1.15 | 1.07 | 0.10 | 0.08 |
| $V_2O_3$ | 0.19 | 0.29 | 0.32 | 0.39 | 0.36 | 0.33 | 0.43 | 0.46 | 0.35 | 0.09 | 0.07 |
| $Al_2O_3$ | 15.69 | 15.07 | 16.56 | 14.77 | 14.74 | 14.73 | 14.60 | 14.23 | 15.05 | 0.74 | 0.62 |
| $Cr_2O_3$ | 43.40 | 44.26 | 43.16 | 44.14 | 43.82 | 43.87 | 44.44 | 44.58 | 43.96 | 0.50 | 0.42 |
| $Fe_2O_3$ | 9.46 | 9.30 | 9.17 | 9.41 | 9.67 | 9.69 | 9.26 | 9.42 | 9.42 | 0.19 | 0.16 |
| FeO | 19.66 | 19.73 | 18.41 | 19.74 | 19.71 | 19.60 | 20.15 | 19.80 | 19.60 | 0.51 | 0.43 |
| MnO | 0.27 | 0.26 | 0.26 | 0.26 | 0.27 | 0.27 | 0.27 | 0.27 | 0.27 | 0.00 | 0.00 |
| NiO | 0.13 | 0.15 | 0.16 | 0.12 | 0.11 | 0.13 | 0.12 | 0.11 | 0.13 | 0.02 | 0.02 |
| CoO | 0.01 | 0.01 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 |
| $Cu_2O$ | 0.09 | 0.05 | 0.02 | 0.07 | 0.00 | 0.03 | 0.00 | 0.01 | 0.03 | 0.03 | 0.03 |
| ZnO | 0.01 | 0.09 | 0.04 | 0.05 | 0.05 | 0.12 | 0.10 | 0.10 | 0.07 | 0.04 | 0.03 |
| MgO | 9.23 | 9.14 | 10.16 | 9.12 | 9.14 | 9.16 | 8.85 | 9.02 | 9.23 | 0.39 | 0.33 |
| Total | 98.93 | 99.19 | 99.08 | 99.11 | 98.84 | 98.89 | 99.10 | 99.00 | 99.02 | 0.12 | 0.10 |
| Number of ions on the basis of 32 O | | | | | | | | | | | |
| Ti | 0.19 | 0.20 | 0.18 | 0.24 | 0.22 | 0.23 | 0.21 | 0.23 | 0.21 | 0.02 | 0.02 |
| V | 0.04 | 0.06 | 0.07 | 0.08 | 0.08 | 0.07 | 0.09 | 0.10 | 0.07 | 0.02 | 0.02 |
| Al | 4.87 | 4.68 | 5.08 | 4.60 | 4.60 | 4.59 | 4.55 | 4.45 | 4.68 | 0.20 | 0.17 |
| Cr | 9.03 | 9.22 | 8.88 | 9.22 | 9.17 | 9.18 | 9.30 | 9.35 | 9.17 | 0.15 | 0.13 |
| $Fe^{3+}$ | 1.87 | 1.84 | 1.80 | 1.87 | 1.93 | 1.93 | 1.85 | 1.88 | 1.87 | 0.04 | 0.04 |
| $Fe^{2+}$ | 4.33 | 4.35 | 4.01 | 4.36 | 4.36 | 4.34 | 4.46 | 4.39 | 4.32 | 0.14 | 0.11 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| Ni | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.02 | 0.03 | 0.00 | 0.00 |
| Co | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.02 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 |
| Zn | 0.00 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| Mg | 3.62 | 3.59 | 3.94 | 3.59 | 3.61 | 3.61 | 3.49 | 3.56 | 3.63 | 0.13 | 0.11 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | | |
| $\Sigma M^{2+}$ | 8.06 | 8.06 | 8.06 | 8.06 | 8.07 | 8.07 | 8.06 | 8.06 | 8.06 | | |

*$x$ = Average  $s$ = standard deviation  CL = 95% confidence limit*

***Table 3*** *Electron-microprobe analyses of selected chromite grains in sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.61 | 0.64 | 0.49 | 0.69 | 0.57 | 0.58 | 0.73 | 1.06 | 1.05 | 1.12 | 1.05 | 1.04 |
| $V_2O_3$ | 0.56 | 0.52 | 0.42 | 0.58 | 0.51 | 0.47 | 0.48 | 0.53 | 0.51 | 0.54 | 0.38 | 0.40 |
| $Al_2O_3$ | 14.03 | 14.54 | 13.54 | 14.58 | 14.51 | 14.13 | 14.47 | 14.40 | 14.87 | 14.58 | 15.03 | 15.48 |
| $Cr_2O_3$ | 44.72 | 44.40 | 46.19 | 44.10 | 44.97 | 46.03 | 44.16 | 43.95 | 43.47 | 44.29 | 43.48 | 43.39 |
| $Fe_2O_3$ | 9.28 | 9.20 | 8.47 | 9.38 | 8.69 | 8.12 | 9.44 | 9.50 | 9.99 | 8.98 | 9.97 | 9.66 |
| FeO | 21.37 | 21.49 | 21.63 | 21.37 | 21.43 | 21.51 | 21.49 | 21.49 | 19.82 | 21.48 | 19.81 | 20.02 |
| MnO | 0.29 | 0.28 | 0.29 | 0.29 | 0.30 | 0.29 | 0.29 | 0.30 | 0.26 | 0.27 | 0.29 | 0.27 |
| NiO | 0.09 | 0.11 | 0.07 | 0.10 | 0.07 | 0.07 | 0.12 | 0.14 | 0.15 | 0.12 | 0.15 | 0.16 |
| CoO | 0.00 | 0.01 | 0.02 | 0.06 | 0.02 | 0.03 | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.00 |
| $Cu_2O$ | 0.05 | 0.00 | 0.00 | 0.04 | 0.02 | 0.02 | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 | 0.03 |
| ZnO | 0.16 | 0.13 | 0.14 | 0.08 | 0.09 | 0.13 | 0.10 | 0.13 | 0.09 | 0.13 | 0.08 | 0.11 |
| MgO | 7.89 | 7.93 | 7.69 | 7.99 | 7.97 | 7.88 | 7.92 | 7.93 | 9.08 | 7.99 | 9.10 | 9.03 |
| Total | 98.95 | 99.14 | 98.85 | 99.14 | 99.08 | 99.15 | 99.09 | 99.29 | 99.14 | 99.37 | 99.18 | 99.44 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | |
| Ti | 0.12 | 0.13 | 0.10 | 0.14 | 0.11 | 0.12 | 0.15 | 0.21 | 0.21 | 0.22 | 0.21 | 0.20 |
| V | 0.12 | 0.11 | 0.09 | 0.12 | 0.11 | 0.10 | 0.10 | 0.11 | 0.11 | 0.11 | 0.08 | 0.08 |
| Al | 4.42 | 4.56 | 4.29 | 4.57 | 4.56 | 4.44 | 4.55 | 4.52 | 4.63 | 4.56 | 4.67 | 4.79 |
| Cr | 9.46 | 9.35 | 9.81 | 9.28 | 9.47 | 9.71 | 9.31 | 9.25 | 9.07 | 9.30 | 9.07 | 9.01 |
| $Fe^{3+}$ | 1.87 | 1.84 | 1.71 | 1.88 | 1.74 | 1.63 | 1.89 | 1.90 | 1.98 | 1.80 | 1.98 | 1.91 |
| $Fe^{2+}$ | 4.78 | 4.79 | 4.86 | 4.76 | 4.77 | 4.80 | 4.79 | 4.79 | 4.38 | 4.77 | 4.37 | 4.40 |
| Mn | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 |
| Ni | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Co | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| Zn | 0.03 | 0.03 | 0.03 | 0.02 | 0.02 | 0.03 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 |
| Mg | 3.15 | 3.15 | 3.08 | 3.17 | 3.17 | 3.13 | 3.15 | 3.15 | 3.57 | 3.16 | 3.58 | 3.54 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 |

***Table 3 continued*** *Electron-microprobe analyses of selected chromite grains in sample C1.*

| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 1.04 | 1.03 | 1.04 | 1.04 | 1.03 | 1.03 | 1.05 | 1.03 | 1.05 | 1.05 | 0.91 | 0.21 | 0.15 |
| $V_2O_3$ | 0.36 | 0.38 | 0.41 | 0.40 | 0.46 | 0.47 | 0.42 | 0.47 | 0.38 | 0.33 | 0.45 | 0.07 | 0.05 |
| $Al_2O_3$ | 15.49 | 15.43 | 15.50 | 15.43 | 15.44 | 15.51 | 15.56 | 15.42 | 15.58 | 15.55 | 14.96 | 0.61 | 0.44 |
| $Cr_2O_3$ | 43.30 | 43.15 | 43.14 | 43.44 | 43.31 | 43.32 | 43.33 | 43.52 | 43.28 | 43.27 | 43.92 | 0.88 | 0.63 |
| $Fe_2O_3$ | 9.81 | 9.84 | 9.77 | 9.58 | 9.72 | 9.67 | 9.60 | 9.58 | 9.66 | 9.69 | 9.44 | 0.48 | 0.34 |
| FeO | 19.88 | 19.96 | 19.89 | 20.04 | 19.97 | 20.03 | 20.00 | 20.02 | 20.01 | 20.03 | 20.58 | 0.77 | 0.55 |
| MnO | 0.27 | 0.27 | 0.26 | 0.26 | 0.28 | 0.28 | 0.26 | 0.27 | 0.26 | 0.25 | 0.28 | 0.01 | 0.01 |
| NiO | 0.16 | 0.14 | 0.15 | 0.15 | 0.16 | 0.15 | 0.15 | 0.16 | 0.15 | 0.16 | 0.13 | 0.03 | 0.02 |
| CoO | 0.01 | 0.00 | 0.01 | 0.00 | 0.03 | 0.00 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| $Cu_2O$ | 0.03 | 0.00 | 0.01 | 0.01 | 0.02 | 0.03 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.02 | 0.01 |
| ZnO | 0.10 | 0.08 | 0.11 | 0.12 | 0.08 | 0.07 | 0.11 | 0.13 | 0.09 | 0.09 | 0.11 | 0.02 | 0.02 |
| MgO | 9.12 | 9.07 | 9.11 | 9.02 | 9.06 | 9.06 | 9.06 | 9.03 | 9.08 | 9.05 | 8.59 | 0.59 | 0.42 |
| Total | 99.41 | 99.20 | 99.23 | 99.32 | 99.40 | 99.47 | 99.42 | 99.51 | 99.40 | 99.32 | 99.25 | | |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | |
| Ti | 0.21 | 0.20 | 0.21 | 0.21 | 0.20 | 0.20 | 0.21 | 0.20 | 0.21 | 0.21 | 0.18 | 0.04 | 0.03 |
| V | 0.08 | 0.08 | 0.09 | 0.09 | 0.10 | 0.10 | 0.09 | 0.10 | 0.08 | 0.07 | 0.10 | 0.02 | 0.01 |
| Al | 4.79 | 4.79 | 4.80 | 4.78 | 4.78 | 4.80 | 4.81 | 4.77 | 4.82 | 4.82 | 4.66 | 0.16 | 0.11 |
| Cr | 8.99 | 8.98 | 8.97 | 9.03 | 9.00 | 8.99 | 8.99 | 9.03 | 8.98 | 8.99 | 9.18 | 0.25 | 0.18 |
| $Fe^{3+}$ | 1.94 | 1.95 | 1.93 | 1.90 | 1.92 | 1.91 | 1.90 | 1.89 | 1.91 | 1.92 | 1.88 | 0.09 | 0.06 |
| $Fe^{2+}$ | 4.36 | 4.39 | 4.37 | 4.41 | 4.39 | 4.40 | 4.39 | 4.39 | 4.39 | 4.40 | 4.55 | 0.20 | 0.15 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.06 | 0.00 | 0.00 |
| Ni | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.01 | 0.00 |
| Co | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Zn | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.00 | 0.00 |
| Mg | 3.57 | 3.56 | 3.57 | 3.54 | 3.55 | 3.54 | 3.55 | 3.54 | 3.55 | 3.54 | 3.39 | 0.21 | 0.15 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | | |
| $\Sigma M^{2+}$ | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.05 | 8.06 | 8.06 | | |

*$\bar{x}$ = Average s = standard deviation CL = 95% confidence limit*

***Table 4*** *Electron-microprobe analyses of selected sintered chromite grains in sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **$TiO_2$** | 1.19 | 1.17 | 1.18 | 1.19 | 1.19 | 3.45 | 1.19 | 1.20 | 1.20 | 1.18 | 1.18 | 1.19 | 0.01 | 0.01 |
| **$V_2O_3$** | 0.43 | 0.51 | 0.47 | 0.40 | 0.48 | 0.40 | 0.42 | 0.49 | 0.43 | 0.36 | 0.35 | 0.44 | 0.05 | 0.04 |
| **$Al_2O_3$** | 15.15 | 15.18 | 15.20 | 15.27 | 15.19 | 14.54 | 15.16 | 15.08 | 14.89 | 15.16 | 15.26 | 15.16 | 0.11 | 0.08 |
| **$Cr_2O_3$** | 43.32 | 43.41 | 43.34 | 43.42 | 43.45 | 42.87 | 43.38 | 43.55 | 43.74 | 43.78 | 43.55 | 43.49 | 0.16 | 0.11 |
| **$Fe_2O_3$** | 9.98 | 9.89 | 9.92 | 9.84 | 9.91 | 8.46 | 9.97 | 9.79 | 9.76 | 9.73 | 9.96 | 9.87 | 0.09 | 0.07 |
| **FeO** | 19.47 | 19.48 | 19.51 | 19.56 | 19.48 | 20.67 | 19.42 | 19.62 | 19.68 | 19.54 | 19.42 | 19.52 | 0.08 | 0.06 |
| **MnO** | 0.28 | 0.28 | 0.28 | 0.30 | 0.29 | 0.25 | 0.27 | 0.28 | 0.29 | 0.28 | 0.27 | 0.28 | 0.01 | 0.01 |
| **NiO** | 0.17 | 0.15 | 0.14 | 0.16 | 0.17 | 0.14 | 0.15 | 0.14 | 0.16 | 0.16 | 0.17 | 0.16 | 0.01 | 0.01 |
| **CoO** | 0.00 | 0.04 | 0.04 | 0.00 | 0.04 | 0.03 | 0.04 | 0.02 | 0.02 | 0.00 | 0.03 | 0.02 | 0.02 | 0.01 |
| **$Cu_2O$** | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.04 | 0.02 | 0.03 | 0.04 | 0.05 | 0.00 | 0.02 | 0.02 | 0.01 |
| **ZnO** | 0.05 | 0.09 | 0.10 | 0.10 | 0.12 | 0.11 | 0.10 | 0.11 | 0.11 | 0.10 | 0.13 | 0.10 | 0.02 | 0.02 |
| **MgO** | 9.38 | 9.37 | 9.33 | 9.32 | 9.33 | 8.61 | 9.38 | 9.25 | 9.15 | 9.31 | 9.42 | 9.32 | 0.08 | 0.05 |
| **Total** | 99.23 | 99.38 | 99.35 | 99.37 | 99.49 | 99.12 | 99.32 | 99.38 | 99.29 | 99.49 | 99.56 | 99.39 | 0.10 | 0.07 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | |
| **Ti** | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.69 | 0.24 | 0.24 | 0.24 | 0.23 | 0.23 | 0.23 | 0.00 | 0.00 |
| **V** | 0.09 | 0.11 | 0.10 | 0.08 | 0.10 | 0.09 | 0.09 | 0.10 | 0.09 | 0.08 | 0.07 | 0.09 | 0.01 | 0.01 |
| **Al** | 4.69 | 4.70 | 4.71 | 4.73 | 4.70 | 4.55 | 4.69 | 4.67 | 4.62 | 4.69 | 4.71 | 4.69 | 0.03 | 0.02 |
| **Cr** | 9.00 | 9.01 | 9.00 | 9.01 | 9.01 | 8.99 | 9.01 | 9.05 | 9.11 | 9.08 | 9.02 | 9.03 | 0.04 | 0.03 |
| **$Fe^{3+}$** | 1.98 | 1.95 | 1.96 | 1.94 | 1.96 | 1.69 | 1.97 | 1.94 | 1.93 | 1.92 | 1.96 | 1.95 | 0.02 | 0.01 |
| **$Fe^{2+}$** | 4.28 | 4.28 | 4.29 | 4.29 | 4.27 | 4.59 | 4.27 | 4.31 | 4.34 | 4.29 | 4.25 | 4.29 | 0.02 | 0.02 |
| **Mn** | 0.06 | 0.06 | 0.06 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| **Ni** | 0.04 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Zn** | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.00 | 0.00 |
| **Mg** | 3.68 | 3.67 | 3.65 | 3.65 | 3.65 | 3.41 | 3.67 | 3.63 | 3.59 | 3.64 | 3.68 | 3.65 | 0.03 | 0.02 |
| **$\Sigma(M^{3+},M^{4+})$** | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | | |
| **$\Sigma M^{2+}$** | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.11 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | | |

$\bar{x}$ = Average s = standard deviation CL = 95% confidence limit

***Table 5*** *Electron-microprobe analyses of selected sintered chromite grains in sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **$TiO_2$** | 1.31 | 1.22 | 1.30 | 1.31 | 1.30 | 1.29 | 1.30 | 1.30 | 1.31 | 1.30 | 1.29 | 0.03 | 0.02 |
| **$V_2O_3$** | 0.46 | 0.31 | 0.39 | 0.35 | 0.44 | 0.36 | 0.42 | 0.44 | 0.43 | 0.43 | 0.40 | 0.05 | 0.03 |
| **$Al_2O_3$** | 15.00 | 15.01 | 15.19 | 15.27 | 15.22 | 15.23 | 15.19 | 15.22 | 15.31 | 15.21 | 15.19 | 0.10 | 0.07 |
| **$Cr_2O_3$** | 42.94 | 42.95 | 43.07 | 43.02 | 42.94 | 42.80 | 42.78 | 42.97 | 42.94 | 42.96 | 42.94 | 0.09 | 0.06 |
| **$Fe_2O_3$** | 10.24 | 10.44 | 10.14 | 10.08 | 10.09 | 10.25 | 10.25 | 10.01 | 10.06 | 10.02 | 10.16 | 0.14 | 0.10 |
| **FeO** | 20.11 | 20.04 | 20.05 | 20.22 | 20.25 | 20.11 | 20.08 | 20.22 | 20.10 | 20.19 | 20.14 | 0.08 | 0.06 |
| **MnO** | 0.27 | 0.29 | 0.25 | 0.24 | 0.26 | 0.27 | 0.25 | 0.26 | 0.27 | 0.26 | 0.26 | 0.01 | 0.01 |
| **NiO** | 0.16 | 0.15 | 0.16 | 0.16 | 0.17 | 0.17 | 0.16 | 0.16 | 0.15 | 0.18 | 0.16 | 0.01 | 0.01 |
| **CoO** | 0.02 | 0.02 | 0.02 | 0.01 | 0.00 | 0.01 | 0.03 | 0.00 | 0.03 | 0.03 | 0.02 | 0.01 | 0.01 |
| **$Cu_2O$** | 0.03 | 0.08 | 0.08 | 0.05 | 0.02 | 0.00 | 0.03 | 0.01 | 0.04 | 0.01 | 0.04 | 0.03 | 0.02 |
| **ZnO** | 0.09 | 0.08 | 0.11 | 0.11 | 0.10 | 0.11 | 0.10 | 0.11 | 0.15 | 0.14 | 0.11 | 0.02 | 0.02 |
| **MgO** | 8.93 | 8.93 | 8.99 | 8.91 | 8.90 | 8.96 | 8.97 | 8.91 | 8.96 | 8.88 | 8.93 | 0.04 | 0.03 |
| **Total** | 99.37 | 99.36 | 99.57 | 99.55 | 99.49 | 99.37 | 99.37 | 99.41 | 99.55 | 99.43 | 99.45 | 0.08 | 0.06 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | |
| **Ti** | 0.26 | 0.24 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.00 | 0.00 |
| **V** | 0.10 | 0.07 | 0.08 | 0.07 | 0.09 | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.08 | 0.01 | 0.01 |
| **Al** | 4.66 | 4.66 | 4.71 | 4.73 | 4.72 | 4.73 | 4.72 | 4.72 | 4.74 | 4.72 | 4.71 | 0.03 | 0.02 |
| **Cr** | 8.95 | 8.95 | 8.95 | 8.94 | 8.93 | 8.91 | 8.91 | 8.94 | 8.92 | 8.94 | 8.94 | 0.02 | 0.01 |
| **$Fe^{3+}$** | 2.03 | 2.07 | 2.01 | 1.99 | 2.00 | 2.03 | 2.03 | 1.98 | 1.99 | 1.99 | 2.01 | 0.03 | 0.02 |
| **$Fe^{2+}$** | 4.43 | 4.42 | 4.41 | 4.45 | 4.46 | 4.43 | 4.42 | 4.45 | 4.42 | 4.45 | 4.43 | 0.02 | 0.01 |
| **Mn** | 0.06 | 0.06 | 0.05 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| **Ni** | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.01 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 |
| **Zn** | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.02 | 0.00 | 0.00 |
| **Mg** | 3.51 | 3.51 | 3.52 | 3.49 | 3.49 | 3.52 | 3.52 | 3.50 | 3.51 | 3.48 | 3.50 | 0.01 | 0.01 |
| **$\Sigma(M^{3+},M^{4+})$** | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | | |
| **$\Sigma M^{2+}$** | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | 8.06 | | |

*$x$ = Average  $s$ = standard deviation  CL = 95% confidence limit*

***Table 6*** *Electron-microprobe analyses of selected chromite grains in sample A5.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.08 | 1.06 | 1.03 | 1.05 | 1.01 | 1.07 | 0.93 | 0.96 |
| $V_2O_3$ | 0.29 | 0.23 | 0.23 | 0.26 | 0.32 | 0.27 | 0.24 | 0.27 | 0.25 | 0.26 | 0.23 | 0.22 | 0.27 |
| $Al_2O_3$ | 17.64 | 17.51 | 17.23 | 17.42 | 17.31 | 17.78 | 17.11 | 16.99 | 17.25 | 16.92 | 17.15 | 17.38 | 17.11 |
| $Cr_2O_3$ | 44.45 | 44.57 | 44.78 | 44.32 | 44.60 | 44.07 | 44.65 | 44.96 | 44.77 | 44.72 | 44.56 | 44.50 | 44.18 |
| $Fe_2O_3$ | 5.70 | 5.76 | 5.86 | 5.98 | 5.76 | 5.93 | 5.94 | 5.83 | 5.90 | 6.01 | 6.04 | 5.99 | 6.30 |
| FeO | 21.96 | 21.98 | 21.98 | 21.88 | 22.06 | 21.76 | 22.01 | 22.05 | 21.93 | 21.74 | 21.92 | 22.21 | 22.28 |
| MnO | 0.27 | 0.26 | 0.25 | 0.28 | 0.25 | 0.26 | 0.26 | 0.27 | 0.26 | 0.26 | 0.25 | 0.28 | 0.26 |
| NiO | 0.19 | 0.17 | 0.15 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.17 | 0.19 | 0.16 | 0.17 | 0.17 |
| CoO | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.00 | 0.02 |
| $Cu_2O$ | 0.00 | 0.04 | 0.01 | 0.00 | 0.03 | 0.00 | 0.00 | 0.04 | 0.03 | 0.07 | 0.07 | 0.01 | 0.00 |
| ZnO | 0.13 | 0.10 | 0.08 | 0.12 | 0.11 | 0.12 | 0.11 | 0.09 | 0.09 | 0.13 | 0.09 | 0.12 | 0.10 |
| MgO | 8.01 | 7.98 | 8.00 | 8.01 | 7.92 | 8.16 | 7.92 | 7.88 | 8.01 | 7.96 | 7.96 | 7.82 | 7.71 |
| Total | 99.54 | 99.52 | 99.48 | 99.35 | 99.43 | 99.46 | 99.32 | 99.44 | 99.59 | 99.16 | 99.37 | 99.48 | 99.22 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | |
| Ti | 0.20 | 0.20 | 0.20 | 0.21 | 0.21 | 0.21 | 0.21 | 0.20 | 0.21 | 0.20 | 0.21 | 0.18 | 0.19 |
| V | 0.06 | 0.05 | 0.05 | 0.05 | 0.07 | 0.06 | 0.05 | 0.06 | 0.05 | 0.06 | 0.05 | 0.05 | 0.06 |
| Al | 5.43 | 5.40 | 5.32 | 5.38 | 5.35 | 5.47 | 5.30 | 5.26 | 5.32 | 5.25 | 5.30 | 5.37 | 5.31 |
| Cr | 9.18 | 9.22 | 9.27 | 9.18 | 9.24 | 9.10 | 9.27 | 9.33 | 9.26 | 9.31 | 9.24 | 9.22 | 9.20 |
| $Fe^{3+}$ | 1.12 | 1.13 | 1.16 | 1.18 | 1.14 | 1.16 | 1.17 | 1.15 | 1.16 | 1.19 | 1.19 | 1.18 | 1.25 |
| $Fe^{2+}$ | 4.80 | 4.81 | 4.81 | 4.79 | 4.83 | 4.75 | 4.83 | 4.84 | 4.80 | 4.79 | 4.81 | 4.87 | 4.91 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Ni | 0.04 | 0.04 | 0.03 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.04 | 0.04 | 0.03 | 0.04 | 0.04 |
| Co | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| Cu | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 |
| Zn | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Mg | 3.12 | 3.11 | 3.12 | 3.13 | 3.09 | 3.17 | 3.10 | 3.08 | 3.12 | 3.12 | 3.11 | 3.05 | 3.03 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.04 | 8.05 |

***Table 6 continued*** *Electron-microprobe analyses of selected chromite grains in sample A5.*

| | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.96 | 0.97 | 0.96 | 0.96 | 0.96 | 0.94 | 0.98 | 0.96 | 1.04 | 1.07 | 1.07 | 1.06 | 1.04 |
| $V_2O_3$ | 0.26 | 0.26 | 0.25 | 0.28 | 0.26 | 0.22 | 0.28 | 0.29 | 0.25 | 0.19 | 0.22 | 0.25 | 0.28 |
| $Al_2O_3$ | 17.36 | 17.33 | 17.22 | 17.24 | 17.14 | 16.98 | 17.43 | 17.20 | 17.41 | 17.04 | 17.14 | 17.17 | 17.17 |
| $Cr_2O_3$ | 43.62 | 43.99 | 44.11 | 44.03 | 44.23 | 44.45 | 43.84 | 44.06 | 44.96 | 45.20 | 45.05 | 44.96 | 45.14 |
| $Fe_2O_3$ | 6.55 | 6.33 | 6.35 | 6.32 | 6.25 | 6.36 | 6.27 | 6.27 | 5.52 | 5.76 | 5.83 | 5.71 | 5.60 |
| FeO | 22.07 | 22.19 | 22.22 | 22.20 | 22.23 | 22.12 | 22.24 | 22.24 | 21.27 | 21.37 | 21.31 | 21.38 | 21.50 |
| MnO | 0.25 | 0.25 | 0.28 | 0.25 | 0.26 | 0.26 | 0.25 | 0.26 | 0.25 | 0.24 | 0.24 | 0.26 | 0.24 |
| NiO | 0.16 | 0.19 | 0.18 | 0.19 | 0.18 | 0.18 | 0.17 | 0.17 | 0.17 | 0.15 | 0.15 | 0.17 | 0.17 |
| CoO | 0.03 | 0.02 | 0.01 | 0.00 | 0.01 | 0.06 | 0.01 | 0.02 | 0.00 | 0.06 | 0.01 | 0.02 | 0.02 |
| $Cu_2O$ | 0.04 | 0.03 | 0.00 | 0.08 | 0.04 | 0.05 | 0.02 | 0.03 | 0.00 | 0.03 | 0.00 | 0.06 | 0.00 |
| ZnO | 0.12 | 0.09 | 0.13 | 0.11 | 0.10 | 0.11 | 0.10 | 0.13 | 0.11 | 0.10 | 0.10 | 0.11 | 0.05 |
| MgO | 7.82 | 7.79 | 7.76 | 7.74 | 7.73 | 7.76 | 7.77 | 7.71 | 8.44 | 8.32 | 8.43 | 8.28 | 8.31 |
| Total | 99.10 | 99.29 | 99.30 | 99.27 | 99.26 | 99.34 | 99.22 | 99.20 | 99.25 | 99.37 | 99.38 | 99.28 | 99.36 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | |
| Ti | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.20 | 0.21 | 0.21 | 0.21 | 0.20 |
| V | 0.06 | 0.05 | 0.05 | 0.06 | 0.06 | 0.05 | 0.06 | 0.06 | 0.05 | 0.04 | 0.05 | 0.05 | 0.06 |
| Al | 5.38 | 5.37 | 5.33 | 5.34 | 5.32 | 5.26 | 5.40 | 5.34 | 5.36 | 5.26 | 5.28 | 5.30 | 5.29 |
| Cr | 9.08 | 9.14 | 9.17 | 9.16 | 9.20 | 9.25 | 9.11 | 9.17 | 9.29 | 9.36 | 9.31 | 9.31 | 9.34 |
| $Fe^{3+}$ | 1.30 | 1.25 | 1.26 | 1.25 | 1.24 | 1.26 | 1.24 | 1.24 | 1.09 | 1.13 | 1.15 | 1.13 | 1.10 |
| $Fe^{2+}$ | 4.86 | 4.88 | 4.89 | 4.88 | 4.89 | 4.87 | 4.89 | 4.90 | 4.65 | 4.68 | 4.66 | 4.68 | 4.71 |
| Mn | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.06 | 0.05 |
| Ni | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.04 | 0.04 |
| Co | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Cu | 0.01 | 0.01 | 0.00 | 0.02 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Zn | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| Mg | 3.07 | 3.05 | 3.04 | 3.03 | 3.03 | 3.04 | 3.05 | 3.03 | 3.29 | 3.25 | 3.28 | 3.23 | 3.24 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 |

***Table 6 continued*** *Electron-microprobe analyses of selected chromite grains in sample A5.*

| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 0.90 | 0.91 | 0.92 | 0.93 | 0.91 | 0.94 | 0.95 | 0.97 | 0.95 | 0.97 | 0.97 | 0.99 | 0.05 | 0.02 |
| $V_2O_3$ | 0.34 | 0.29 | 0.27 | 0.27 | 0.24 | 0.28 | 0.38 | 0.36 | 0.33 | 0.34 | 0.30 | 0.27 | 0.04 | 0.01 |
| $Al_2O_3$ | 18.69 | 18.31 | 18.18 | 17.78 | 18.11 | 18.30 | 17.55 | 17.56 | 17.53 | 17.44 | 17.38 | 17.44 | 0.41 | 0.14 |
| $Cr_2O_3$ | 42.91 | 43.35 | 43.35 | 43.53 | 43.00 | 43.03 | 43.73 | 43.72 | 43.73 | 43.64 | 43.73 | 44.18 | 0.63 | 0.21 |
| $Fe_2O_3$ | 5.97 | 6.03 | 6.17 | 6.28 | 6.38 | 6.22 | 6.28 | 6.31 | 6.34 | 6.48 | 6.35 | 6.08 | 0.27 | 0.09 |
| FeO | 21.58 | 21.71 | 21.75 | 21.75 | 21.61 | 21.72 | 21.86 | 21.93 | 21.83 | 21.95 | 21.94 | 21.88 | 0.28 | 0.09 |
| MnO | 0.25 | 0.25 | 0.25 | 0.27 | 0.26 | 0.25 | 0.26 | 0.27 | 0.26 | 0.25 | 0.25 | 0.26 | 0.01 | 0.00 |
| NiO | 0.16 | 0.18 | 0.17 | 0.17 | 0.17 | 0.17 | 0.16 | 0.18 | 0.18 | 0.18 | 0.16 | 0.17 | 0.01 | 0.00 |
| CoO | 0.01 | 0.05 | 0.03 | 0.00 | 0.05 | 0.00 | 0.04 | 0.00 | 0.00 | 0.02 | 0.00 | 0.02 | 0.02 | 0.01 |
| $Cu_2O$ | 0.06 | 0.04 | 0.01 | 0.02 | 0.03 | 0.02 | 0.01 | 0.08 | 0.02 | 0.00 | 0.03 | 0.03 | 0.02 | 0.01 |
| ZnO | 0.09 | 0.08 | 0.09 | 0.08 | 0.05 | 0.09 | 0.08 | 0.11 | 0.11 | 0.12 | 0.03 | 0.10 | 0.02 | 0.01 |
| MgO | 8.30 | 8.18 | 8.16 | 8.10 | 8.18 | 8.20 | 8.03 | 7.95 | 8.03 | 7.94 | 7.96 | 8.01 | 0.21 | 0.07 |
| Total | 99.12 | 99.24 | 99.23 | 99.03 | 98.84 | 99.06 | 99.17 | 99.29 | 99.17 | 99.19 | 98.96 | 99.28 | 0.16 | 0.05 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | |
| Ti | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.20 | 0.01 | 0.00 |
| V | 0.07 | 0.06 | 0.06 | 0.06 | 0.05 | 0.06 | 0.08 | 0.08 | 0.07 | 0.07 | 0.06 | 0.06 | 0.01 | 0.00 |
| Al | 5.74 | 5.63 | 5.60 | 5.49 | 5.60 | 5.64 | 5.42 | 5.43 | 5.42 | 5.40 | 5.39 | 5.39 | 0.12 | 0.04 |
| Cr | 8.84 | 8.95 | 8.95 | 9.03 | 8.91 | 8.89 | 9.07 | 9.06 | 9.07 | 9.06 | 9.10 | 9.16 | 0.13 | 0.04 |
| $Fe^{3+}$ | 1.17 | 1.18 | 1.21 | 1.24 | 1.26 | 1.22 | 1.24 | 1.24 | 1.25 | 1.28 | 1.26 | 1.20 | 0.06 | 0.02 |
| $Fe^{2+}$ | 4.70 | 4.74 | 4.75 | 4.77 | 4.74 | 4.75 | 4.80 | 4.81 | 4.79 | 4.82 | 4.83 | 4.80 | 0.07 | 0.02 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| Ni | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.03 | 0.04 | 0.00 | 0.00 |
| Co | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 |
| Zn | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.00 | 0.00 |
| Mg | 3.22 | 3.18 | 3.18 | 3.17 | 3.20 | 3.19 | 3.14 | 3.11 | 3.14 | 3.11 | 3.12 | 3.13 | 0.07 | 0.02 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | | |
| $\Sigma M^{2+}$ | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | | |

*$\bar{x}$ = Average s = standard deviation CL = 95% confidence limit*

***Table 7*** *Electron-microprobe analyses of selected sintered chromite grains in sample A5.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 1.99 | 2.01 | 1.99 | 2.01 | 2.00 | 1.97 | 2.00 | 2.01 | 1.89 | 1.94 | 3.03 |
| $V_2O_3$ | 0.26 | 0.32 | 0.33 | 0.26 | 0.30 | 0.24 | 0.29 | 0.33 | 0.23 | 0.25 | 0.26 |
| $Al_2O_3$ | 14.88 | 15.13 | 15.07 | 15.06 | 15.03 | 15.46 | 15.80 | 15.70 | 15.43 | 15.66 | 12.71 |
| $Cr_2O_3$ | 41.15 | 40.72 | 40.80 | 41.08 | 41.09 | 40.43 | 40.05 | 40.54 | 41.28 | 40.74 | 40.43 |
| $Fe_2O_3$ | 9.43 | 9.50 | 9.40 | 9.25 | 9.36 | 9.82 | 9.87 | 9.59 | 9.35 | 9.57 | 11.23 |
| FeO | 25.16 | 25.16 | 25.10 | 25.24 | 25.19 | 24.36 | 24.38 | 24.48 | 24.48 | 24.54 | 26.21 |
| MnO | 0.28 | 0.30 | 0.28 | 0.30 | 0.28 | 0.28 | 0.30 | 0.29 | 0.29 | 0.31 | 0.31 |
| NiO | 0.16 | 0.16 | 0.16 | 0.17 | 0.17 | 0.14 | 0.16 | 0.13 | 0.14 | 0.14 | 0.14 |
| CoO | 0.00 | 0.02 | 0.02 | 0.02 | 0.01 | 0.04 | 0.00 | 0.01 | 0.02 | 0.01 | 0.03 |
| $Cu_2O$ | 0.06 | 0.03 | 0.04 | 0.01 | 0.07 | 0.00 | 0.05 | 0.01 | 0.06 | 0.00 | 0.06 |
| ZnO | 0.14 | 0.14 | 0.14 | 0.15 | 0.15 | 0.15 | 0.13 | 0.13 | 0.13 | 0.12 | 0.15 |
| MgO | 5.52 | 5.55 | 5.58 | 5.49 | 5.52 | 6.12 | 6.15 | 6.15 | 6.08 | 6.10 | 4.65 |
| Total | 98.75 | 98.74 | 98.68 | 98.74 | 98.89 | 98.72 | 98.88 | 99.07 | 99.13 | 99.10 | 98.80 |
| Number of ions on the basis of 32 O | | | | | | | | | | | |
| Ti | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.40 | 0.41 | 0.41 | 0.38 | 0.39 | 0.63 |
| V | 0.06 | 0.07 | 0.07 | 0.06 | 0.06 | 0.05 | 0.06 | 0.07 | 0.05 | 0.05 | 0.06 |
| Al | 4.77 | 4.84 | 4.82 | 4.82 | 4.81 | 4.92 | 5.01 | 4.97 | 4.89 | 4.96 | 4.14 |
| Cr | 8.84 | 8.74 | 8.76 | 8.82 | 8.81 | 8.63 | 8.52 | 8.61 | 8.78 | 8.66 | 8.84 |
| $Fe^{3+}$ | 1.93 | 1.94 | 1.92 | 1.89 | 1.91 | 1.99 | 2.00 | 1.94 | 1.89 | 1.94 | 2.34 |
| $Fe^{2+}$ | 5.72 | 5.71 | 5.70 | 5.73 | 5.71 | 5.50 | 5.49 | 5.50 | 5.51 | 5.52 | 6.06 |
| Mn | 0.06 | 0.07 | 0.06 | 0.07 | 0.07 | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Ni | 0.04 | 0.03 | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Co | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Cu | 0.01 | 0.01 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| Zn | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.02 | 0.03 |
| Mg | 2.24 | 2.24 | 2.26 | 2.22 | 2.23 | 2.46 | 2.47 | 2.46 | 2.44 | 2.44 | 1.92 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.10 | 8.10 | 8.10 | 8.10 | 8.09 | 8.10 | 8.09 | 8.09 | 8.08 | 8.09 | 8.13 |

***Table 7 continued*** *Electron-microprobe analyses of selected sintered chromite grains in sample A5.*

| | 12 | 13 | 14 | 15 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|
| **$TiO_2$** | 3.00 | 2.93 | 2.93 | 2.98 | 2.31 | 0.49 | 0.28 |
| **$V_2O_3$** | 0.29 | 0.29 | 0.27 | 0.31 | 0.28 | 0.03 | 0.02 |
| **$Al_2O_3$** | 12.77 | 12.67 | 12.81 | 12.79 | 14.46 | 1.28 | 0.75 |
| **$Cr_2O_3$** | 40.49 | 40.75 | 40.65 | 40.57 | 40.72 | 0.33 | 0.19 |
| **$Fe_2O_3$** | 11.16 | 11.02 | 11.03 | 11.10 | 10.05 | 0.80 | 0.47 |
| **FeO** | 26.21 | 26.23 | 26.27 | 26.33 | 25.29 | 0.77 | 0.45 |
| **MnO** | 0.31 | 0.31 | 0.31 | 0.30 | 0.30 | 0.01 | 0.01 |
| **NiO** | 0.13 | 0.16 | 0.14 | 0.15 | 0.15 | 0.01 | 0.01 |
| **CoO** | 0.07 | 0.00 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| **$Cu_2O$** | 0.07 | 0.04 | 0.00 | 0.01 | 0.03 | 0.03 | 0.02 |
| **ZnO** | 0.17 | 0.16 | 0.17 | 0.11 | 0.14 | 0.02 | 0.01 |
| **MgO** | 4.64 | 4.64 | 4.66 | 4.66 | 5.43 | 0.63 | 0.37 |
| **Total** | 98.88 | 98.81 | 98.84 | 98.91 | 98.86 | 0.14 | 0.08 |
| Number of ions on the basis of 32 O | | | | | | | |
| **Ti** | 0.62 | 0.61 | 0.61 | 0.62 | 0.47 | 0.11 | 0.06 |
| **V** | 0.06 | 0.07 | 0.06 | 0.07 | 0.06 | 0.01 | 0.00 |
| **Al** | 4.16 | 4.13 | 4.17 | 4.16 | 4.64 | 0.36 | 0.21 |
| **Cr** | 8.84 | 8.90 | 8.87 | 8.85 | 8.77 | 0.11 | 0.06 |
| **$Fe^{3+}$** | 2.32 | 2.29 | 2.29 | 2.30 | 2.06 | 0.18 | 0.11 |
| **$Fe^{2+}$** | 6.05 | 6.06 | 6.07 | 6.08 | 5.76 | 0.24 | 0.14 |
| **Mn** | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.00 | 0.00 |
| **Ni** | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 |
| **Co** | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 |
| **Zn** | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.00 | 0.00 |
| **Mg** | 1.91 | 1.91 | 1.92 | 1.92 | 2.20 | 0.23 | 0.13 |
| **$\Sigma(M^{3+},M^{4+})$** | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | | |
| **$\Sigma M^{2+}$** | 8.13 | 8.13 | 8.12 | 8.12 | 8.10 | | |

*$x$ = Average s = standard deviation CL = 95% confidence limit*

***Table 8*** *Electron-microprobe analyses of selected sintered chromite grains in sample B4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 1.34 | 1.35 | 1.34 | 1.38 | 1.39 | 1.40 | 1.43 | 1.41 | 1.38 | 1.38 | 1.38 | 1.30 | 1.24 | 1.17 |
| $V_2O_3$ | 0.33 | 0.37 | 0.36 | 0.48 | 0.39 | 0.35 | 0.35 | 0.38 | 0.42 | 0.42 | 0.44 | 0.36 | 0.44 | 0.34 |
| $Al_2O_3$ | 15.15 | 15.34 | 15.06 | 14.94 | 14.50 | 14.58 | 14.62 | 14.80 | 14.63 | 14.82 | 14.62 | 15.44 | 15.07 | 14.98 |
| $Cr_2O_3$ | 42.03 | 41.81 | 41.89 | 41.71 | 42.30 | 41.75 | 41.35 | 41.44 | 42.07 | 41.82 | 41.90 | 41.64 | 41.92 | 41.41 |
| $Fe_2O_3$ | 10.78 | 10.74 | 10.76 | 10.87 | 10.62 | 11.20 | 11.42 | 11.33 | 10.99 | 11.04 | 11.02 | 10.88 | 10.73 | 11.53 |
| FeO | 21.56 | 21.46 | 21.50 | 21.43 | 21.68 | 21.41 | 21.41 | 21.36 | 21.49 | 21.45 | 21.49 | 20.86 | 20.91 | 21.03 |
| MnO | 0.28 | 0.27 | 0.28 | 0.27 | 0.27 | 0.28 | 0.26 | 0.27 | 0.26 | 0.27 | 0.27 | 0.27 | 0.26 | 0.29 |
| NiO | 0.19 | 0.20 | 0.18 | 0.18 | 0.18 | 0.16 | 0.19 | 0.20 | 0.16 | 0.15 | 0.16 | 0.18 | 0.17 | 0.16 |
| CoO | 0.01 | 0.02 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 | 0.04 | 0.00 | 0.00 | 0.03 | 0.01 |
| $Cu_2O$ | 0.01 | 0.03 | 0.00 | 0.04 | 0.00 | 0.03 | 0.00 | 0.01 | 0.01 | 0.04 | 0.00 | 0.02 | 0.00 | 0.01 |
| ZnO | 0.09 | 0.07 | 0.00 | 0.06 | 0.02 | 0.05 | 0.03 | 0.00 | 0.03 | 0.00 | 0.01 | 0.03 | 0.03 | 0.04 |
| MgO | 8.04 | 8.11 | 8.07 | 8.03 | 7.84 | 8.00 | 8.00 | 8.09 | 8.03 | 8.06 | 8.03 | 8.51 | 8.40 | 8.30 |
| Total | 99.62 | 99.57 | 99.24 | 99.22 | 99.00 | 99.00 | 98.86 | 99.08 | 99.28 | 99.29 | 99.10 | 99.29 | 99.00 | 99.09 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | |
| Ti | 0.27 | 0.27 | 0.27 | 0.28 | 0.28 | 0.28 | 0.29 | 0.28 | 0.28 | 0.28 | 0.28 | 0.26 | 0.25 | 0.23 |
| V | 0.07 | 0.08 | 0.08 | 0.10 | 0.08 | 0.07 | 0.07 | 0.08 | 0.09 | 0.09 | 0.09 | 0.08 | 0.09 | 0.07 |
| Al | 4.72 | 4.78 | 4.71 | 4.68 | 4.57 | 4.58 | 4.61 | 4.64 | 4.59 | 4.64 | 4.59 | 4.81 | 4.72 | 4.69 |
| Cr | 8.79 | 8.74 | 8.79 | 8.77 | 8.94 | 8.81 | 8.74 | 8.72 | 8.85 | 8.79 | 8.83 | 8.70 | 8.80 | 8.70 |
| $Fe^{3+}$ | 2.15 | 2.14 | 2.15 | 2.17 | 2.13 | 2.25 | 2.30 | 2.27 | 2.20 | 2.21 | 2.21 | 2.16 | 2.14 | 2.30 |
| $Fe^{2+}$ | 4.77 | 4.74 | 4.77 | 4.76 | 4.84 | 4.78 | 4.78 | 4.76 | 4.78 | 4.77 | 4.79 | 4.61 | 4.64 | 4.67 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.07 |
| Ni | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 |
| Co | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 |
| Cu | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| Zn | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 |
| Mg | 3.17 | 3.19 | 3.19 | 3.18 | 3.12 | 3.18 | 3.19 | 3.21 | 3.19 | 3.19 | 3.19 | 3.35 | 3.32 | 3.29 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| $\Sigma M^{2+}$ | 8.06 | 8.07 | 8.07 | 8.07 | 8.08 | 8.08 | 8.08 | 8.08 | 8.07 | 8.07 | 8.07 | 8.07 | 8.07 | 8.07 |

***Table 8 continued*** *Electron-microprobe analyses of selected sintered chromite grains in sample B4.*

| | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 1.32 | 1.18 | 1.17 | 1.30 | 1.30 | 1.34 | 1.32 | 1.33 | 1.32 | 1.29 | 1.33 | 1.31 | 1.31 | 1.22 |
| $V_2O_3$ | 0.42 | 0.40 | 0.37 | 0.47 | 0.37 | 0.46 | 0.44 | 0.45 | 0.41 | 0.36 | 0.34 | 0.43 | 0.32 | 0.44 |
| $Al_2O_3$ | 15.17 | 14.98 | 15.42 | 15.01 | 14.91 | 14.81 | 14.85 | 14.98 | 14.87 | 15.11 | 14.99 | 15.08 | 15.08 | 15.21 |
| $Cr_2O_3$ | 41.58 | 41.79 | 41.65 | 42.05 | 42.03 | 41.98 | 42.18 | 41.96 | 41.93 | 41.48 | 41.83 | 41.76 | 41.72 | 41.47 |
| $Fe_2O_3$ | 10.93 | 10.97 | 10.61 | 10.73 | 10.88 | 8.99 | 8.77 | 8.88 | 8.90 | 9.19 | 8.84 | 8.98 | 8.95 | 9.06 |
| FeO | 20.78 | 20.94 | 20.66 | 20.92 | 20.88 | 22.85 | 23.03 | 23.01 | 22.97 | 22.87 | 23.06 | 22.86 | 23.06 | 23.00 |
| MnO | 0.28 | 0.28 | 0.28 | 0.28 | 0.26 | 0.27 | 0.28 | 0.29 | 0.27 | 0.27 | 0.28 | 0.28 | 0.27 | 0.26 |
| NiO | 0.16 | 0.15 | 0.15 | 0.18 | 0.16 | 0.19 | 0.16 | 0.19 | 0.18 | 0.15 | 0.16 | 0.17 | 0.17 | 0.16 |
| CoO | 0.01 | 0.01 | 0.02 | 0.03 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.02 | 0.01 | 0.01 | 0.00 |
| $Cu_2O$ | 0.03 | 0.02 | 0.04 | 0.00 | 0.00 | 0.08 | 0.00 | 0.04 | 0.00 | 0.03 | 0.00 | 0.04 | 0.00 | 0.02 |
| ZnO | 0.04 | 0.04 | 0.03 | 0.02 | 0.02 | 0.05 | 0.05 | 0.02 | 0.02 | 0.04 | 0.01 | 0.05 | 0.03 | 0.07 |
| MgO | 8.47 | 8.33 | 8.59 | 8.41 | 8.43 | 8.22 | 8.20 | 8.21 | 8.25 | 8.25 | 8.22 | 8.27 | 8.21 | 8.15 |
| Total | 98.98 | 98.92 | 99.03 | 99.18 | 99.05 | 99.24 | 99.31 | 99.34 | 99.14 | 99.09 | 99.08 | 99.26 | 99.12 | 99.06 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | |
| Ti | 0.26 | 0.24 | 0.23 | 0.26 | 0.26 | 0.27 | 0.26 | 0.27 | 0.26 | 0.26 | 0.27 | 0.26 | 0.26 | 0.24 |
| V | 0.09 | 0.09 | 0.08 | 0.10 | 0.08 | 0.10 | 0.09 | 0.09 | 0.09 | 0.08 | 0.07 | 0.09 | 0.07 | 0.09 |
| Al | 4.74 | 4.70 | 4.80 | 4.69 | 4.66 | 4.64 | 4.65 | 4.68 | 4.66 | 4.73 | 4.69 | 4.71 | 4.72 | 4.76 |
| Cr | 8.72 | 8.79 | 8.71 | 8.81 | 8.82 | 8.82 | 8.85 | 8.79 | 8.81 | 8.71 | 8.79 | 8.75 | 8.76 | 8.71 |
| $Fe^{3+}$ | 2.18 | 2.20 | 2.11 | 2.14 | 2.17 | 1.80 | 1.75 | 1.77 | 1.78 | 1.84 | 1.77 | 1.79 | 1.79 | 1.81 |
| $Fe^{2+}$ | 4.61 | 4.66 | 4.57 | 4.64 | 4.64 | 5.07 | 5.11 | 5.10 | 5.10 | 5.08 | 5.12 | 5.07 | 5.12 | 5.11 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Ni | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.04 | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | 0.04 | 0.04 | 0.03 |
| Co | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| Zn | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 |
| Mg | 3.35 | 3.30 | 3.39 | 3.32 | 3.34 | 3.26 | 3.24 | 3.24 | 3.27 | 3.26 | 3.26 | 3.27 | 3.25 | 3.23 |
| $\Sigma(M^{3+},M^{4+})$ | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 15.61 | 15.60 | 15.61 | 15.59 | 15.61 | 15.59 | 15.61 | 15.60 | 15.62 |
| $\Sigma M^{2+}$ | 8.07 | 8.07 | 8.07 | 8.07 | 8.07 | 8.46 | 8.47 | 8.46 | 8.48 | 8.47 | 8.48 | 8.46 | 8.47 | 8.45 |

***Table 8 continued*** *Electron-microprobe analyses of selected sintered chromite grains in sample B4.*

| | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | $\bar{x}$ | s | CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $TiO_2$ | 1.29 | 1.32 | 1.29 | 1.29 | 1.11 | 1.25 | 1.14 | 1.28 | 1.25 | 1.18 | 1.30 | 1.30 | 0.08 | 0.03 |
| $V_2O_3$ | 0.43 | 0.48 | 0.42 | 0.38 | 0.45 | 0.42 | 0.48 | 0.45 | 0.39 | 0.36 | 0.45 | 0.40 | 0.05 | 0.01 |
| $Al_2O_3$ | 14.93 | 15.00 | 15.10 | 15.14 | 15.81 | 15.32 | 15.26 | 15.32 | 14.83 | 14.67 | 14.97 | 15.01 | 0.27 | 0.09 |
| $Cr_2O_3$ | 41.87 | 41.71 | 41.54 | 41.65 | 42.00 | 41.93 | 41.54 | 41.69 | 42.16 | 42.33 | 41.78 | 41.81 | 0.24 | 0.08 |
| $Fe_2O_3$ | 8.98 | 8.93 | 8.96 | 9.11 | 8.32 | 8.45 | 8.94 | 8.69 | 8.60 | 8.81 | 8.80 | 9.88 | 1.08 | 0.35 |
| FeO | 22.80 | 22.99 | 22.81 | 22.56 | 22.44 | 22.81 | 22.58 | 22.84 | 22.93 | 22.90 | 22.89 | 22.06 | 0.87 | 0.28 |
| MnO | 0.28 | 0.27 | 0.28 | 0.28 | 0.28 | 0.27 | 0.27 | 0.28 | 0.28 | 0.27 | 0.28 | 0.27 | 0.01 | 0.00 |
| NiO | 0.17 | 0.17 | 0.17 | 0.18 | 0.15 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.17 | 0.01 | 0.00 |
| CoO | 0.03 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.02 | 0.04 | 0.02 | 0.03 | 0.04 | 0.02 | 0.01 | 0.00 |
| $Cu_2O$ | 0.02 | 0.00 | 0.00 | 0.09 | 0.04 | 0.01 | 0.00 | 0.04 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| ZnO | 0.11 | 0.11 | 0.13 | 0.10 | 0.08 | 0.06 | 0.10 | 0.04 | 0.09 | 0.11 | 0.11 | 0.05 | 0.04 | 0.01 |
| MgO | 8.24 | 8.20 | 8.27 | 8.35 | 8.41 | 8.30 | 8.24 | 8.25 | 8.07 | 8.01 | 8.20 | 8.21 | 0.16 | 0.05 |
| Total | 99.16 | 99.20 | 98.97 | 99.15 | 99.12 | 98.99 | 98.88 | 99.09 | 98.85 | 98.91 | 98.99 | 99.12 | 0.17 | 0.06 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | |
| Ti | 0.26 | 0.26 | 0.26 | 0.26 | 0.22 | 0.25 | 0.23 | 0.25 | 0.25 | 0.24 | 0.26 | 0.26 | 0.02 | 0.01 |
| V | 0.09 | 0.10 | 0.09 | 0.08 | 0.09 | 0.09 | 0.10 | 0.10 | 0.08 | 0.08 | 0.10 | 0.09 | 0.01 | 0.00 |
| Al | 4.67 | 4.69 | 4.73 | 4.73 | 4.92 | 4.79 | 4.78 | 4.79 | 4.66 | 4.61 | 4.69 | 4.70 | 0.07 | 0.02 |
| Cr | 8.79 | 8.75 | 8.73 | 8.73 | 8.77 | 8.80 | 8.73 | 8.74 | 8.89 | 8.93 | 8.79 | 8.78 | 0.06 | 0.02 |
| $Fe^{3+}$ | 1.80 | 1.78 | 1.79 | 1.82 | 1.65 | 1.69 | 1.79 | 1.73 | 1.73 | 1.77 | 1.76 | 1.97 | 0.22 | 0.07 |
| $Fe^{2+}$ | 5.06 | 5.10 | 5.07 | 5.00 | 4.96 | 5.06 | 5.02 | 5.07 | 5.12 | 5.11 | 5.09 | 4.90 | 0.19 | 0.06 |
| Mn | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.00 | 0.00 |
| Ni | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.00 | 0.00 |
| Co | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| Cu | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Zn | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.00 |
| Mg | 3.26 | 3.25 | 3.28 | 3.30 | 3.31 | 3.28 | 3.27 | 3.26 | 3.21 | 3.19 | 3.25 | 3.25 | 0.06 | 0.02 |
| $\Sigma(M^{3+},M^{4+})$ | 15.61 | 15.60 | 15.60 | 15.62 | 15.66 | 15.61 | 15.63 | 15.62 | 15.62 | 15.63 | 15.60 | 15.80 | | |
| $\Sigma M^{2+}$ | 8.46 | 8.47 | 8.48 | 8.45 | 8.40 | 8.46 | 8.44 | 8.45 | 8.46 | 8.44 | 8.47 | 8.27 | | |

*$\bar{x}$ = Average s = standard deviation CL = 95% confidence limit*

# APPENDIX E

*SEM-EDS analyses of selected silicate grains reported as mass % oxide.*

***Table 1*** *Plagioclase analyses: sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.0 | 3.4 | 3.0 | 3.0 | 3.2 | 3.2 | 3.5 | 3.0 | 3.1 | 3.4 | 3.0 | 3.3 | 3.5 | 4.6 | 3.1 | 4.0 | 4.4 |
| MgO | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| $Al_2O_3$ | 32.6 | 32.2 | 32.8 | 32.8 | 32.4 | 32.6 | 31.9 | 32.9 | 32.6 | 32.6 | 32.5 | 32.3 | 31.6 | 30.4 | 32.2 | 31.2 | 30.8 |
| $SiO_2$ | 49.2 | 50.0 | 49.1 | 49.4 | 49.6 | 49.7 | 50.5 | 49.5 | 49.4 | 50.0 | 49.1 | 49.7 | 50.2 | 52.9 | 49.2 | 51.4 | 52.5 |
| $K_2O$ | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| CaO | 15.3 | 14.7 | 15.4 | 15.3 | 15.1 | 15.2 | 14.5 | 15.4 | 15.3 | 14.6 | 15.2 | 14.9 | 14.3 | 12.4 | 15.0 | 13.7 | 12.9 |
| $TiO_2$ | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| $Cr_2O_3$ | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.1 | 0.2 | 0.3 | 0.1 | 0.1 | 0.3 | 0.2 | 0.3 | 0.1 | 0.2 | 0.2 |
| MnO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FeO | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 |
| Total | 100.7 | 100.8 | 100.9 | 101.2 | 100.8 | 101.3 | 101.0 | 101.4 | 101.1 | 101.1 | 100.2 | 100.8 | 100.2 | 101.2 | 100.0 | 100.9 | 101.2 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | | | | |
| Na | 1.2 | 1.3 | 1.2 | 1.2 | 1.3 | 1.3 | 1.4 | 1.2 | 1.2 | 1.3 | 1.2 | 1.3 | 1.3 | 1.8 | 1.2 | 1.6 | 1.7 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 7.0 | 6.9 | 7.0 | 7.0 | 6.9 | 6.9 | 6.8 | 7.0 | 7.0 | 6.9 | 7.0 | 6.9 | 6.9 | 6.4 | 6.9 | 6.6 | 6.5 |
| Si | 8.9 | 9.1 | 8.9 | 8.9 | 9.0 | 9.0 | 9.1 | 8.9 | 8.9 | 9.0 | 9.0 | 9.0 | 9.0 | 9.5 | 9.0 | 9.3 | 9.4 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 3.0 | 2.9 | 3.0 | 3.0 | 2.9 | 2.9 | 2.8 | 3.0 | 3.0 | 2.8 | 3.0 | 2.9 | 2.9 | 2.4 | 2.9 | 2.6 | 2.5 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| An | 71 | 68 | 71 | 71 | 69 | 69 | 66 | 71 | 71 | 68 | 71 | 69 | 69 | 56 | 70 | 62 | 59 |
| Or | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| Ab | 29 | 32 | 28 | 29 | 30 | 30 | 33 | 28 | 29 | 32 | 29 | 30 | 30 | 43 | 30 | 37 | 40 |

*Z=Σ(Si,Al), X=Σ(Na,Ca,K)*

***Table 2*** *Plagioclase analyses: sample B1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.6 | 3.5 | 3.6 | 3.4 | 3.8 | 3.6 | 3.7 | 4.1 | 3.7 | 4.1 | 3.5 | 3.6 | 3.2 | 3.7 | 4.2 | 4.1 |
| MgO | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| $Al_2O_3$ | 31.8 | 31.7 | 31.6 | 31.9 | 31.6 | 31.3 | 30.9 | 30.6 | 30.9 | 30.6 | 32.5 | 31.5 | 32.6 | 32.0 | 30.9 | 30.8 |
| $SiO_2$ | 50.6 | 50.0 | 50.2 | 49.6 | 50.9 | 50.0 | 50.0 | 50.8 | 50.0 | 50.8 | 50.6 | 49.9 | 49.4 | 51.0 | 51.2 | 51.1 |
| $K_2O$ | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| CaO | 14.3 | 14.3 | 14.3 | 14.7 | 14.0 | 14.1 | 13.7 | 13.2 | 13.7 | 13.2 | 14.8 | 14.3 | 15.2 | 14.3 | 13.3 | 13.2 |
| $TiO_2$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| $Cr_2O_3$ | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 |
| MnO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 |
| FeO | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 |
| Total | 100.9 | 100.2 | 100.2 | 100.0 | 100.8 | 99.3 | 98.7 | 99.2 | 98.7 | 99.2 | 102.1 | 99.9 | 101.1 | 101.6 | 100.2 | 99.9 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | | | |
| Na | 1.4 | 1.4 | 1.4 | 1.3 | 1.5 | 1.4 | 1.5 | 1.6 | 1.5 | 1.6 | 1.4 | 1.4 | 1.3 | 1.4 | 1.6 | 1.6 |
| Mg | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.8 | 6.8 | 6.8 | 6.8 | 6.7 | 6.7 | 6.7 | 6.6 | 6.7 | 6.6 | 6.9 | 6.8 | 6.9 | 6.8 | 6.6 | 6.6 |
| Si | 9.1 | 9.1 | 9.1 | 9.1 | 9.2 | 9.2 | 9.2 | 9.3 | 9.2 | 9.3 | 9.0 | 9.1 | 8.9 | 9.1 | 9.3 | 9.3 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.8 | 2.8 | 2.8 | 2.8 | 2.7 | 2.8 | 2.7 | 2.6 | 2.7 | 2.6 | 2.8 | 2.8 | 2.9 | 2.8 | 2.6 | 2.6 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.2 | 4.2 | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| An | 66 | 66 | 66 | 68 | 64 | 66 | 64 | 61 | 64 | 61 | 67 | 66 | 70 | 65 | 61 | 61 |
| Or | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ab | 34 | 33 | 34 | 32 | 36 | 34 | 35 | 39 | 35 | 39 | 32 | 34 | 30 | 34 | 39 | 39 |

*$Z=\Sigma(Si,Al)$, $X=\Sigma(Na,Ca,K)$*

***Table 2*** *Plagioclase analyses: sample B1continued.*

| | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|
| $Na_2O$ | 3.8 | 3.6 | 3.1 | 3.2 | 2.9 | 3.5 |
| MgO | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| $Al_2O_3$ | 31.6 | 31.5 | 32.0 | 32.5 | 32.1 | 31.3 |
| $SiO_2$ | 50.3 | 49.6 | 48.6 | 49.7 | 48.0 | 49.1 |
| $K_2O$ | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| CaO | 14.1 | 14.1 | 14.9 | 15.0 | 15.3 | 14.4 |
| $TiO_2$ | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| $Cr_2O_3$ | 0.4 | 0.5 | 0.1 | 0.1 | 0.3 | 0.1 |
| MnO | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 |
| FeO | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 |
| Total | 100.7 | 99.8 | 99.1 | 100.9 | 99.0 | 98.8 |
| Number of ions on the basis of 32 O | | | | | | |
| Na | 1.5 | 1.4 | 1.2 | 1.3 | 1.2 | 1.4 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.7 | 6.8 | 6.9 | 6.9 | 7.0 | 6.8 |
| Si | 9.1 | 9.1 | 9.0 | 9.0 | 8.9 | 9.1 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.7 | 2.8 | 3.0 | 2.9 | 3.0 | 2.8 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.3 | 4.2 | 4.2 | 4.2 | 4.2 | 4.3 |
| | | | | | | |
| An | 64 | 66 | 70 | 69 | 72 | 67 |
| Or | 0 | 0 | 0 | 0 | 0 | 0 |
| Ab | 36 | 34 | 29 | 30 | 28 | 33 |

*Z=Σ(Si,Al), X=Σ(Na,Ca,K)*

1-10 cumulus Feldspar
11-14 resorbed Feldspar associated with clinopyroxene
15-22 Feldspar rim around cpx altered to talc+tremolite

***Table 3*** *Plagioclase analyses: sample B2.*

| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.0 | 3.3 | 3.3 | 4.2 | 4.7 | 3.8 | 1.8 | 1.4 | 1.8 | 2.6 | 3.2 | 2.8 | 3.0 | 2.2 | 2.8 | 4.5 | 4.4 | 4.6 | 4.7 |
| MgO | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| $Al_2O_3$ | 32.2 | 31.3 | 31.3 | 30.5 | 29.3 | 31.1 | 19.1 | 19.0 | 18.7 | 19.3 | 32.7 | 33.1 | 32.5 | 33.3 | 33.1 | 30.2 | 30.9 | 30.6 | 30.1 |
| $SiO_2$ | 49.0 | 49.6 | 49.6 | 52.2 | 52.5 | 50.8 | 63.5 | 63.7 | 62.7 | 64.4 | 49.9 | 48.8 | 48.8 | 47.1 | 48.4 | 52.2 | 52.6 | 53.4 | 53.6 |
| $K_2O$ | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 14.1 | 15.0 | 14.0 | 13.3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 |
| CaO | 15.2 | 14.3 | 14.3 | 13.0 | 11.9 | 13.7 | 0.1 | 0.0 | 0.1 | 0.2 | 15.3 | 16.0 | 15.5 | 16.6 | 16.0 | 12.8 | 13.1 | 12.8 | 12.3 |
| $TiO_2$ | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.7 | 0.6 | 0.8 | 0.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| $Cr_2O_3$ | 0.1 | 0.1 | 0.4 | 0.2 | 0.2 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| MnO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FeO | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 |
| Total | 99.8 | 99.3 | 99.6 | 100.7 | 99.2 | 100.1 | 99.4 | 100.1 | 98.1 | 100.7 | 101.7 | 101.2 | 100.2 | 99.8 | 100.8 | 100.2 | 101.6 | 102.0 | 101.4 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | | | | | | |
| Na | 1.2 | 1.3 | 1.3 | 1.7 | 1.9 | 1.5 | 0.7 | 0.6 | 0.7 | 1.0 | 1.3 | 1.1 | 1.2 | 0.9 | 1.1 | 1.8 | 1.7 | 1.8 | 1.8 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.9 | 6.8 | 6.8 | 6.5 | 6.3 | 6.7 | 4.2 | 4.1 | 4.1 | 4.1 | 6.9 | 7.1 | 7.0 | 7.2 | 7.1 | 6.4 | 6.5 | 6.4 | 6.3 |
| Si | 9.0 | 9.1 | 9.1 | 9.4 | 9.6 | 9.2 | 11.7 | 11.8 | 11.8 | 11.7 | 9.0 | 8.8 | 8.9 | 8.7 | 8.8 | 9.4 | 9.4 | 9.5 | 9.6 |
| K | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 3.3 | 3.5 | 3.3 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Ca | 3.0 | 2.8 | 2.8 | 2.5 | 2.3 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 3.1 | 3.0 | 3.3 | 3.1 | 2.5 | 2.5 | 2.4 | 2.3 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.3 | 4.2 | 4.2 | 4.2 |
| An | 70 | 67 | 67 | 59 | 55 | 63 | 1 | 0 | 1 | 1 | 70 | 73 | 71 | 78 | 74 | 58 | 59 | 57 | 55 |
| Or | 1 | 1 | 1 | 2 | 1 | 1 | 82 | 86 | 82 | 74 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| Ab | 29 | 32 | 32 | 39 | 44 | 36 | 18 | 14 | 18 | 25 | 30 | 26 | 28 | 21 | 26 | 41 | 40 | 42 | 43 |

*Z=Σ(Si,Al), X=Σ(Na,Ca,K)*

***Table 4*** *Plagioclase analyses: sample B3.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 4.1 | 3.4 | 2.3 | 4.4 | 3.5 | 3.5 | 2.8 | 3.8 |
| MgO | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 |
| $Al_2O_3$ | 30.7 | 32.3 | 33.9 | 31.0 | 32.5 | 32.5 | 33.5 | 32.2 |
| $SiO_2$ | 51.0 | 50.5 | 47.6 | 52.8 | 50.1 | 50.2 | 49.0 | 51.2 |
| $K_2O$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| CaO | 13.3 | 14.6 | 16.9 | 13.3 | 14.9 | 14.9 | 15.7 | 14.2 |
| $TiO_2$ | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| $Cr_2O_3$ | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| MnO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 |
| FeO | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 |
| Total | 99.5 | 101.3 | 100.9 | 101.8 | 101.5 | 101.6 | 101.4 | 101.7 |
| Number of ions on the basis of 32 O | | | | | | | | |
| Na | 1.6 | 1.4 | 0.9 | 1.7 | 1.4 | 1.4 | 1.4 | 1.5 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.6 | 6.8 | 7.3 | 6.5 | 6.9 | 6.9 | 6.8 | 6.8 |
| Si | 9.3 | 9.1 | 8.7 | 9.4 | 9.0 | 9.0 | 9.1 | 9.2 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.6 | 2.8 | 3.3 | 2.5 | 2.9 | 2.9 | 2.8 | 2.7 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.2 | 4.2 | 4.3 | 4.2 | 4.2 | 4.2 | 4.2 |
| An | 61 | 67 | 78 | 59 | 68 | 68 | 67 | 65 |
| Or | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ab | 38 | 32 | 21 | 40 | 32 | 32 | 33 | 35 |

*$Z=\Sigma(Si,Al)$, $X=\Sigma(Na,Ca,K)$*

***Table 5*** *Plagioclase analyses: sample A4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.6 | 3.5 | 3.4 | 3.5 | 3.6 | 3.5 | 3.6 | 3.5 | 3.6 | 3.6 | 3.5 | 3.6 | 3.6 | 3.5 | 1.6 | 1.6 | 1.6 | 1.5 |
| MgO | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| $Al_2O_3$ | 31.8 | 31.8 | 31.5 | 31.4 | 31.5 | 31.3 | 32.1 | 32.3 | 32.6 | 32.7 | 32.0 | 32.4 | 32.3 | 32.2 | 34.1 | 33.8 | 35.2 | 35.2 |
| $SiO_2$ | 50.0 | 50.3 | 49.4 | 49.5 | 49.8 | 49.5 | 50.5 | 49.9 | 50.6 | 50.8 | 50.1 | 50.3 | 50.8 | 50.6 | 45.2 | 45.1 | 46.2 | 46.0 |
| $K_2O$ | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 |
| CaO | 14.2 | 14.2 | 14.2 | 14.2 | 14.0 | 14.2 | 14.4 | 14.4 | 14.6 | 14.6 | 14.4 | 14.5 | 14.5 | 14.6 | 17.4 | 17.4 | 18.1 | 18.1 |
| $TiO_2$ | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | -0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| $Cr_2O_3$ | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 |
| MnO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| FeO | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 |
| Total | 100.1 | 100.2 | 98.8 | 99.1 | 99.5 | 98.9 | 101.1 | 100.9 | 101.9 | 102.5 | 100.6 | 101.4 | 101.6 | 101.2 | 98.9 | 98.4 | 101.6 | 101.1 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | | | | | |
| Na | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 0.7 | 0.7 | 0.6 | 0.6 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.9 | 6.9 | 6.9 | 6.8 | 6.9 | 6.8 | 6.8 | 7.5 | 7.5 | 7.5 | 7.6 |
| Si | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.0 | 9.0 | 9.0 | 9.1 | 9.0 | 9.1 | 9.1 | 8.4 | 8.4 | 8.4 | 8.4 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.8 | 2.8 | 2.8 | 2.8 | 2.7 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 3.5 | 3.5 | 3.5 | 3.5 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.1 |
| An | 65 | 67 | 67 | 67 | 66 | 66 | 66 | 67 | 67 | 66 | 67 | 67 | 67 | 67 | 84 | 84 | 85 | 85 |
| Or | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ab | 34 | 34 | 33 | 34 | 34 | 34 | 34 | 33 | 33 | 34 | 33 | 33 | 33 | 33 | 16 | 16 | 15 | 15 |

*$Z=\Sigma(Si,Al)$, $X=\Sigma(Na,Ca,K)$*

***Table 6*** *Plagioclase analyses: sample A5.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.7 | 3.6 | 3.6 | 3.8 | 4.2 | 3.8 | 3.9 | 3.7 | 3.9 | 4.2 | 11.1 | 11.4 |
| MgO | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| $Al_2O_3$ | 31.7 | 31.5 | 31.7 | 31.7 | 31.4 | 32.0 | 31.2 | 31.6 | 31.1 | 30.8 | 21.1 | 21.2 |
| $SiO_2$ | 50.5 | 50.5 | 50.4 | 51.0 | 52.3 | 51.9 | 51.3 | 50.8 | 51.2 | 51.3 | 67.5 | 66.9 |
| $K_2O$ | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -0.1 | 0.0 |
| CaO | 14.2 | 14.1 | 14.1 | 14.1 | 13.6 | 14.1 | 13.6 | 13.9 | 13.5 | 13.0 | 1.2 | 1.3 |
| $TiO_2$ | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Cr_2O_3$ | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 |
| MnO | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | -0.1 | 0.0 | 0.1 |
| FeO | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 |
| Total | 100.9 | 100.4 | 100.6 | 101.4 | 102.3 | 102.6 | 100.6 | 100.6 | 100.4 | 99.9 | 101.3 | 101.7 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | |
| Na | 1.4 | 1.4 | 1.4 | 1.5 | 1.6 | 1.5 | 1.5 | 1.4 | 1.6 | 1.7 | 4.2 | 4.3 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Al | 6.8 | 6.7 | 6.8 | 6.7 | 6.6 | 6.7 | 6.6 | 6.7 | 6.6 | 6.6 | 4.3 | 4.3 |
| Si | 9.1 | 9.2 | 9.1 | 9.2 | 9.3 | 9.2 | 9.3 | 9.2 | 9.3 | 9.3 | 11.6 | 11.5 |
| K | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.7 | 2.7 | 2.7 | 2.7 | 2.6 | 2.7 | 2.6 | 2.7 | 2.6 | 2.5 | 0.2 | 0.2 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 15.9 |
| X | 4.2 | 4.2 | 4.2 | 4.2 | 4.3 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.5 |
| An | 65 | 65 | 65 | 64 | 60 | 64 | 63 | 64 | 62 | 60 | 5 | 5 |
| Or | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Ab | 34 | 34 | 34 | 35 | 38 | 35 | 37 | 35 | 37 | 39 | 95 | 95 |

*$Z=\Sigma(Si,Al)$, $X=\Sigma(Na,Ca,K)$*

***Table** 7 Plagioclase analyses: sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.4 | 3.5 | 3.1 | 3.1 | 3.1 | 3.2 | 2.3 | 4.3 | 3.5 | 3.6 | 3.3 | 3.3 | 3.1 | 3.2 | 3.3 | 3.5 | 3.6 | 3.3 | 3.3 | 3.1 |
| MgO | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| $Al_2O_3$ | 31.7 | 31.6 | 31.2 | 31.3 | 31.3 | 31.4 | 31.5 | 28.7 | 31.6 | 31.4 | 32.1 | 32.5 | 32.6 | 32.3 | 31.1 | 31.6 | 31.4 | 32.1 | 32.5 | 32.6 |
| $SiO_2$ | 50.7 | 50.6 | 48.8 | 48.9 | 49.3 | 49.3 | 45.6 | 48.9 | 50.5 | 50.6 | 50.4 | 50.5 | 50.3 | 50.1 | 50.8 | 50.5 | 50.6 | 50.4 | 50.5 | 50.3 |
| $K_2O$ | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.0 | 0.0 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.7 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 |
| CaO | 14.5 | 14.5 | 14.5 | 14.4 | 14.6 | 14.5 | 20.6 | 16.3 | 14.1 | 14.2 | 14.9 | 14.9 | 15.2 | 15.1 | 15.3 | 14.1 | 14.2 | 14.9 | 14.9 | 15.2 |
| $TiO_2$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 |
| $Cr_2O_3$ | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.4 | 0.5 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.4 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 |
| MnO | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 |
| FeO | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 |
| Total | 101.0 | 101.1 | 98.2 | 98.4 | 99.0 | 99.2 | 101.0 | 98.9 | 100.6 | 100.7 | 101.4 | 102.0 | 101.9 | 101.3 | 101.9 | 100.6 | 100.7 | 101.4 | 102.0 | 101.9 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | | | | | | | |
| Na | 1.4 | 1.4 | 1.2 | 1.3 | 1.3 | 1.3 | 0.9 | 1.8 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.3 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 |
| Mg | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.7 | 6.7 | 6.8 | 6.8 | 6.8 | 6.8 | 6.9 | 6.3 | 6.7 | 6.7 | 6.8 | 6.9 | 6.9 | 6.9 | 6.6 | 6.7 | 6.7 | 6.8 | 6.9 | 6.9 |
| Si | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 8.5 | 9.1 | 9.2 | 9.2 | 9.1 | 9.0 | 9.0 | 9.0 | 9.1 | 9.2 | 9.2 | 9.1 | 9.0 | 9.0 |
| K | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Ca | 2.8 | 2.8 | 2.9 | 2.9 | 2.9 | 2.9 | 4.1 | 3.3 | 2.7 | 2.7 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.7 | 2.7 | 2.9 | 2.9 | 2.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 15.9 | 16.0 | 15.5 | 15.5 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 15.9 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.3 | 4.2 | 4.2 | 4.2 | 4.2 | 5.0 | 5.0 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| An | 66 | 66 | 69 | 68 | 69 | 68 | 81 | 65 | 65 | 65 | 68 | 68 | 70 | 69 | 67 | 65 | 65 | 68 | 68 | 70 |
| Or | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 |
| Ab | 32 | 32 | 30 | 30 | 30 | 31 | 19 | 35 | 33 | 34 | 31 | 31 | 29 | 30 | 29 | 33 | 34 | 31 | 31 | 29 |

*Z=Σ(Si,Al), X=Σ(Na,Ca,K)*

***Table 7 continued**. Plagioclase analyses: sample C1*

| | **21** | **22** | **23** | **24** | **25** | **26** |
|---|---|---|---|---|---|---|
| $Na_2O$ | 3.2 | 3.3 | 10.1 | 10.2 | 10.4 | 10.7 |
| MgO | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| $Al_2O_3$ | 32.3 | 31.1 | 22.7 | 22.6 | 21.6 | 21.5 |
| $SiO_2$ | 50.1 | 50.8 | 65.5 | 65.3 | 66.0 | 66.1 |
| $K_2O$ | 0.2 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| CaO | 15.1 | 15.3 | 3.1 | 3.0 | 1.9 | 1.7 |
| $TiO_2$ | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| $Cr_2O_3$ | 0.2 | 0.4 | 0.1 | 0.1 | 0.4 | 0.4 |
| MnO | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| FeO | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 |
| Total | 101.3 | 101.9 | 101.7 | 101.4 | 100.6 | 100.8 |
| Number of ions on the basis of 32 O | | | | | | |
| Na | 1.2 | 1.3 | 3.8 | 3.8 | 3.9 | 4.0 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.9 | 6.6 | 4.6 | 4.6 | 4.4 | 4.4 |
| Si | 9.0 | 9.1 | 11.3 | 11.3 | 11.4 | 11.5 |
| K | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.9 | 2.9 | 0.6 | 0.6 | 0.4 | 0.3 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 16.0 | 15.9 | 15.9 | 15.9 | 16.0 | 0.0 |
| X | 4.2 | 4.4 | 4.4 | 4.4 | 4.3 | 16.0 |
| | | | | | | |
| An | 69 | 67 | 13 | 13 | 8 | 7 |
| Or | 1 | 4 | 0 | 0 | 0 | 0 |
| Ab | 30 | 29 | 87 | 87 | 92 | 93 |

*$Z=\Sigma(Si,Al)$, $X=\Sigma(Na,Ca,K)$*

***Table 8*** *Plagioclase analyses: sample C5.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 3.5 | 2.9 | 2.9 | 3.1 | 3.1 | 3.2 | 3.1 | 2.2 | 2.4 | 1.5 | 2.3 | 2.3 | 3.4 | 3.6 | 3.3 | 3.4 | 3.4 | 2.9 |
| MgO | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 |
| $Al_2O_3$ | 31.5 | 31.6 | 31.6 | 31.6 | 31.8 | 31.7 | 31.2 | 33.1 | 32.8 | 34.6 | 33.1 | 33.1 | 31.7 | 31.5 | 31.9 | 31.9 | 31.9 | 32.1 |
| $SiO_2$ | 50.5 | 48.3 | 48.3 | 49.0 | 49.3 | 49.9 | 48.6 | 47.3 | 47.9 | 46.1 | 47.9 | 47.9 | 50.4 | 50.6 | 49.9 | 50.6 | 50.8 | 49.0 |
| $K_2O$ | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 |
| CaO | 14.1 | 14.9 | 14.9 | 14.5 | 14.6 | 14.4 | 14.6 | 16.2 | 15.8 | 17.6 | 16.1 | 16.1 | 14.4 | 14.1 | 14.6 | 14.2 | 14.2 | 15.0 |
| $TiO_2$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Cr_2O_3$ | 0.2 | 0.1 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.3 | 0.4 | 0.6 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 |
| MnO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FeO | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 |
| Total | 100.4 | 98.2 | 98.2 | 99.0 | 99.7 | 100.1 | 98.1 | 99.7 | 100.1 | 101.3 | 100.5 | 100.5 | 100.6 | 100.9 | 100.7 | 101.2 | 101.6 | 100.0 |
| Number of ions on the basis of 32 O | | | | | | | | | | | | | | | | | | |
| Na | 1.4 | 1.2 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 0.9 | 1.0 | 0.6 | 0.9 | 0.9 | 1.3 | 1.4 | 1.3 | 1.4 | 1.3 | 1.2 |
| Mg | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Al | 6.7 | 6.9 | 6.9 | 6.9 | 6.9 | 6.8 | 6.8 | 7.2 | 7.1 | 7.4 | 7.1 | 7.1 | 6.8 | 6.7 | 6.8 | 6.8 | 6.8 | 6.9 |
| Si | 9.2 | 9.0 | 9.0 | 9.0 | 9.0 | 9.1 | 9.0 | 8.7 | 8.8 | 8.4 | 8.8 | 8.8 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.0 |
| K | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ca | 2.7 | 3.0 | 3.0 | 2.9 | 2.9 | 2.8 | 2.9 | 3.2 | 3.1 | 3.4 | 3.1 | 3.1 | 2.8 | 2.7 | 2.8 | 2.7 | 2.7 | 2.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| Z | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| X | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| An | 65 | 71 | 71 | 69 | 69 | 67 | 69 | 77 | 75 | 83 | 76 | 76 | 66 | 65 | 68 | 66 | 66 | 70 |
| Or | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Ab | 33 | 28 | 28 | 30 | 30 | 31 | 30 | 22 | 24 | 15 | 23 | 23 | 32 | 34 | 31 | 32 | 32 | 28 |

*Z=Σ(Si,Al), X=Σ(Na,Ca,K)*

***Table 9*** *Pyroxene analyses: Sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| MgO | 33.7 | 33.2 | 33.4 | 32.8 | 33.3 | 32.6 | 32.4 | 32.6 | 32.7 | 32.7 | 33.1 | 32.6 | 32.8 | 32.9 | 33.2 | 33.2 | 32.6 | 32.8 | 32.7 | 33.3 | 33.0 | 33.4 |
| $Al_2O_3$ | 1.1 | 1.0 | 1.5 | 0.8 | 0.9 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.0 | 1.0 | 0.8 | 1.1 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.9 | 1.0 | 0.9 |
| $SiO_2$ | 57.0 | 56.7 | 56.9 | 56.2 | 56.5 | 56.2 | 56.0 | 56.0 | 56.1 | 56.0 | 56.3 | 55.9 | 56.2 | 56.4 | 56.8 | 56.8 | 56.3 | 56.4 | 55.8 | 56.9 | 56.3 | 56.9 |
| $K_2O$ | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 |
| CaO | 0.7 | 0.8 | 0.6 | 0.7 | 0.6 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.5 | 0.8 | 0.5 |
| $TiO_2$ | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 |
| $Cr_2O_3$ | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.8 | 0.4 | 0.5 | 0.4 |
| MnO | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 |
| FeO | 8.2 | 8.6 | 8.4 | 8.8 | 8.3 | 8.8 | 9.0 | 8.7 | 8.7 | 8.8 | 8.2 | 8.5 | 8.8 | 8.4 | 8.6 | 8.6 | 8.4 | 8.9 | 8.4 | 8.7 | 8.5 | 8.6 |
| NiO | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Total | 102.0 | 101.5 | 102.1 | 100.4 | 101.0 | 101.0 | 100.7 | 100.4 | 100.8 | 100.9 | 100.6 | 100.0 | 100.4 | 100.9 | 101.7 | 101.7 | 100.4 | 101.3 | 100.3 | 101.7 | 100.8 | 101.6 |
| Number of ions on the basis of 6 O | | | | | | | | | | | | | | | | | | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| Al | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Si | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Wo | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| En | 87 | 86 | 87 | 86 | 87 | 85 | 85 | 86 | 86 | 86 | 87 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 87 |
| Fs | 12 | 13 | 12 | 13 | 12 | 13 | 13 | 13 | 13 | 13 | 12 | 13 | 13 | 12 | 13 | 13 | 12 | 13 | 12 | 13 | 12 | 12 |

*$Z=\Sigma(Al,Si)$, $X=\Sigma(Na, Mg, K, Ca, Ti, Cr, Mn, Fe^{2+}, Ni)$*

***Table 10*** *Pyroxene analyses: Sample B1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 |
| MgO | 33.1 | 33.0 | 33.1 | 31.8 | 32.2 | 31.3 | 32.4 | 31.8 | 33.2 | 33.2 | 33.0 | 16.8 | 16.6 | 16.7 | 17.2 | 17.1 | 17.1 | 16.9 | 16.8 | 16.7 | 17.0 | 16.7 |
| $Al_2O_3$ | 1.1 | 0.8 | 1.0 | 1.3 | 1.1 | 1.2 | 1.1 | 1.3 | 1.0 | 1.0 | 1.3 | 1.8 | 2.1 | 2.0 | 1.7 | 1.4 | 1.6 | 1.7 | 1.5 | 1.6 | 1.8 | 1.8 |
| $SiO_2$ | 56.7 | 55.9 | 56.1 | 55.2 | 55.7 | 54.8 | 56.2 | 55.2 | 56.2 | 56.2 | 56.4 | 52.6 | 52.4 | 52.2 | 53.2 | 53.1 | 53.1 | 52.5 | 52.8 | 52.2 | 53.3 | 52.5 |
| $K_2O$ | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CaO | 0.7 | 0.4 | 0.6 | 0.6 | 0.8 | 0.8 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 23.3 | 22.8 | 22.9 | 23.2 | 23.5 | 23.2 | 24.1 | 23.4 | 23.0 | 23.4 | 23.1 |
| $TiO_2$ | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| $Cr_2O_3$ | 0.6 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.5 | 0.5 | 1.1 | 1.2 | 1.2 | 1.1 | 1.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.2 |
| MnO | 0.2 | 0.1 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| FeO | 8.7 | 8.0 | 8.2 | 9.6 | 9.5 | 9.6 | 9.3 | 9.6 | 8.3 | 8.0 | 8.5 | 3.3 | 3.6 | 3.4 | 3.1 | 3.1 | 3.3 | 2.9 | 3.2 | 3.1 | 3.2 | 3.2 |
| NiO | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 |
| Total | 101.9 | 99.1 | 100.5 | 99.8 | 100.6 | 98.8 | 101.1 | 99.8 | 100.9 | 100.4 | 101.2 | 99.9 | 99.6 | 99.4 | 100.5 | 100.2 | 100.3 | 100.2 | 99.6 | 98.8 | 100.7 | 99.5 |
| Number of ions on the basis of 6 O | | | | | | | | | | | | | | | | | | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Al | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Si | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Wo | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 47 | 47 | 47 | 47 | 47 | 47 | 48 | 47 | 47 | 47 | 47 |
| En | 86 | 87 | 87 | 85 | 85 | 84 | 85 | 85 | 87 | 87 | 86 | 47 | 47 | 48 | 48 | 48 | 48 | 47 | 47 | 48 | 48 | 48 |
| Fs | 13 | 12 | 12 | 14 | 14 | 14 | 14 | 14 | 12 | 12 | 12 | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

*$Z=\Sigma(Al,Si)$, $X=\Sigma(Na, Mg, K, Ca, Ti, Cr, Mn, Fe^{2+}, Ni)$*

***Table 10 continued.*** *Pyroxene analyses: Sample B1*

| | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|
| $Na_2O$ | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 |
| MgO | 16.5 | 17.3 | 16.9 | 16.8 | 16.7 |
| $Al_2O_3$ | 1.8 | 1.6 | 1.8 | 1.5 | 1.5 |
| $SiO_2$ | 51.8 | 53.7 | 52.9 | 52.7 | 52.2 |
| $K_2O$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CaO | 22.5 | 23.5 | 23.2 | 23.5 | 22.9 |
| $TiO_2$ | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| $Cr_2O_3$ | 1.1 | 1.0 | 1.2 | 0.9 | 0.8 |
| MnO | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 |
| FeO | 3.6 | 3.1 | 3.3 | 2.8 | 3.2 |
| NiO | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 |
| Total | 98.2 | 101.1 | 100.1 | 99.0 | 98.3 |
| Number of ions on the basis of 6 O | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Al | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Si | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | | | | | |
| Wo | 47 | 47 | 47 | 48 | 47 |
| En | 48 | 48 | 48 | 48 | 48 |
| Fs | 6 | 5 | 5 | 5 | 5 |

*$Z=\Sigma(Al,Si)$, $X=\Sigma(Na, Mg, K, Ca, Ti, Cr, Mn, Fe^{2+}, Ni)$*

***Table 11*** *Pyroxene analyses: Sample B2 (1-4) and B3 (5-9).*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.6 | 0.4 | 0.5 |
| MgO | 32.5 | 33.0 | 33.1 | 33.3 | 17.3 | 16.6 | 16.9 | 16.8 | 33.1 |
| $Al_2O_3$ | 1.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.7 | 1.5 | 1.5 | 1.5 |
| $SiO_2$ | 54.8 | 56.0 | 56.2 | 56.4 | 53.6 | 52.3 | 52.9 | 52.7 | 56.8 |
| $K_2O$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 |
| CaO | 0.2 | 0.4 | 0.3 | 0.4 | 23.9 | 23.1 | 23.7 | 23.7 | 0.4 |
| $TiO_2$ | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 | 0.2 |
| $Cr_2O_3$ | 0.5 | 0.5 | 0.6 | 0.6 | 1.0 | 1.1 | 1.0 | 0.9 | 0.5 |
| MnO | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 |
| FeO | 8.0 | 8.3 | 8.2 | 8.3 | 3.2 | 3.4 | 3.1 | 3.0 | 8.5 |
| NiO | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 |
| Total | 98.5 | 100.8 | 101.1 | 101.5 | 101.5 | 99.2 | 100.0 | 99.4 | 101.8 |
| Number of ions on the basis of 6 O | | | | | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 1.7 | 1.7 | 1.7 | 1.7 | 0.9 | 0.9 | 0.9 | 0.9 | 1.7 |
| Al | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Si | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.0 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Wo | 0 | 1 | 1 | 1 | 47 | 47 | 48 | 48 | 1 |
| En | 88 | 87 | 87 | 87 | 48 | 47 | 47 | 47 | 87 |
| Fs | 12 | 12 | 12 | 12 | 5 | 5 | 5 | 5 | 13 |

*$Z=\Sigma(Al,Si)$, $X=\Sigma(Na, Mg, K, Ca, Ti, Cr, Mn, Fe^{2+}, Ni)$*

***Table 12*** *Pyroxene analyses: Sample A4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 0.6 | 0.6 | 0.5 | 0.6 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.5 | 0.7 | 0.6 | 0.7 | 0.5 | 0.4 | 0.4 | 0.6 | 0.5 |
| MgO | 31.6 | 31.8 | 31.6 | 16.7 | 17.0 | 16.5 | 16.7 | 16.8 | 16.7 | 17.2 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 17.0 | 17.0 | 17.0 | 16.8 | 17.1 | 16.6 |
| $Al_2O_3$ | 1.0 | 1.0 | 1.3 | 2.0 | 1.9 | 1.7 | 1.8 | 1.8 | 1.7 | 1.8 | 1.8 | 1.6 | 1.8 | 1.7 | 1.8 | 1.7 | 1.6 | 1.4 | 1.5 | 1.5 | 1.7 |
| $SiO_2$ | 56.4 | 56.2 | 56.4 | 52.6 | 52.6 | 52.9 | 52.9 | 53.4 | 53.3 | 54.0 | 54.1 | 53.4 | 53.3 | 53.1 | 53.1 | 53.4 | 53.6 | 53.8 | 53.6 | 53.7 | 52.8 |
| $K_2O$ | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| CaO | 0.7 | 0.7 | 1.0 | 22.1 | 21.6 | 22.6 | 22.6 | 22.8 | 22.7 | 22.9 | 22.8 | 22.9 | 23.0 | 22.4 | 22.6 | 23.2 | 23.3 | 23.1 | 23.2 | 23.4 | 22.8 |
| $TiO_2$ | 0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 |
| $Cr_2O_3$ | 0.5 | 0.4 | 0.5 | 1.0 | 1.0 | 1.1 | 1.1 | 1.2 | 1.1 | 1.2 | 1.2 | 1.1 | 1.0 | 0.9 | 1.0 | 0.9 | 0.9 | 0.8 | 1.1 | 1.1 | 1.0 |
| MnO | 0.2 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 |
| FeO | 10.6 | 10.6 | 10.4 | 4.6 | 4.9 | 4.4 | 4.4 | 4.4 | 4.3 | 4.6 | 4.7 | 4.4 | 4.1 | 4.5 | 4.4 | 4.1 | 3.7 | 4.6 | 4.0 | 3.7 | 4.4 |
| NiO | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 |
| Total | 101.7 | 101.7 | 102.0 | 100.0 | 100.2 | 100.2 | 100.6 | 101.2 | 100.7 | 102.5 | 102.7 | 101.4 | 101.0 | 100.4 | 100.6 | 101.3 | 101.1 | 101.4 | 101.1 | 101.3 | 100.1 |
| Number of ions on the basis of 6 O | | | | | | | | | | | | | | | | | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 1.6 | 1.6 | 1.6 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Al | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Si | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.0 | 0.0 | 0.0 | 0.9 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.3 | 0.3 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Wo | 1 | 1 | 2 | 45 | 44 | 46 | 46 | 46 | 46 | 45 | 45 | 46 | 46 | 45 | 46 | 46 | 47 | 46 | 47 | 47 | 46 |
| En | 83 | 83 | 83 | 47 | 48 | 47 | 47 | 47 | 47 | 47 | 48 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| Fs | 16 | 16 | 15 | 7 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 6 | 7 | 6 | 6 | 7 |

*$Z=\Sigma(Al,Si)$, $X=\Sigma(Na, Mg, K, Ca, Ti, Cr, Mn, Fe^{2+}, Ni)$*

***Table 12 continued*** *Pyroxene analyses: Sample A4*

| | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|
| $Na_2O$ | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 |
| MgO | 16.6 | 16.5 | 16.6 | 16.6 | 16.5 |
| $Al_2O_3$ | 1.9 | 1.6 | 1.7 | 1.7 | 1.6 |
| $SiO_2$ | 52.9 | 52.3 | 52.7 | 52.2 | 52.0 |
| $K_2O$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CaO | 22.7 | 23.0 | 22.9 | 22.5 | 22.5 |
| $TiO_2$ | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 |
| $Cr_2O_3$ | 0.9 | 1.1 | 1.0 | 1.0 | 0.9 |
| MnO | 0.1 | 0.1 | 0.2 | 0.0 | 0.1 |
| FeO | 4.5 | 4.0 | 4.1 | 4.2 | 4.4 |
| NiO | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| Total | 100.3 | 99.4 | 99.8 | 99.0 | 98.7 |
| Number of ions on the basis of 6 O | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Al | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Si | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | | | | | |
| Wo | 46 | 47 | 47 | 46 | 46 |
| En | 47 | 47 | 47 | 47 | 47 |
| Fs | 7 | 6 | 6 | 7 | 7 |

*Z=Σ(Al,Si), X=Σ(Na, Mg, K, Ca, Ti, Cr, Mn, $Fe^{2+}$, Ni)*

***Table 13*** *Pyroxene analyses: Sample C1(1-7) and C5 (8-9).*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 |
| MgO | 33.9 | 33.7 | 33.5 | 33.7 | 33.8 | 34.2 | 34.2 | 17.1 | 17.0 |
| $Al_2O_3$ | 1.3 | 1.4 | 1.4 | 1.4 | 1.2 | 1.2 | 1.3 | 1.7 | 1.9 |
| $SiO_2$ | 56.5 | 56.4 | 56.6 | 56.8 | 56.6 | 56.8 | 56.8 | 53.1 | 52.5 |
| $K_2O$ | 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 |
| CaO | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 24.1 | 24.0 |
| $TiO_2$ | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 |
| $Cr_2O_3$ | 0.9 | 0.8 | 0.7 | 0.9 | 0.9 | 0.7 | 0.6 | 1.2 | 1.3 |
| MnO | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 |
| FeO | 7.8 | 8.1 | 8.3 | 7.9 | 7.8 | 7.6 | 7.7 | 2.9 | 3.0 |
| NiO | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 |
| Total | 101.6 | 101.8 | 101.9 | 101.9 | 101.8 | 101.8 | 101.8 | 101.0 | 100.4 |
| Number of ions on the basis of 6 O | | | | | | | | | |
| Na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 0.9 | 0.9 |
| Al | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| Si | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| X | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | | | | | | | | | |
| Wo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 48 | 48 |
| En | 88 | 87 | 87 | 88 | 88 | 88 | 88 | 47 | 47 |
| Fs | 11 | 12 | 12 | 11 | 11 | 11 | 11 | 5 | 5 |

*Z=Σ(Al,Si), X=Σ(Na, Mg, K, Ca, Ti, Cr, Mn, $Fe^{2+}$, Ni)*

***Table 14*** *Selected phlogopite analyses.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| $Na_2O$ | 0.4 | 1.0 | 1.7 | 1.7 | 0.3 | 0.3 | 0.2 |
| MgO | 22.3 | 20.6 | 24.3 | 23.8 | 21.9 | 22.0 | 21.8 |
| $Al_2O_3$ | 15.6 | 15.8 | 17.9 | 16.9 | 14.3 | 14.2 | 14.3 |
| $SiO_2$ | 38.3 | 38.0 | 39.8 | 40.2 | 38.5 | 38.6 | 38.7 |
| $K_2O$ | 10.4 | 9.3 | 7.9 | 7.9 | 9.8 | 9.7 | 9.8 |
| CaO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| $TiO_2$ | 4.3 | 1.6 | 0.6 | 1.4 | 4.5 | 4.6 | 5.2 |
| $Cr_2O_3$ | 1.8 | 1.5 | 1.2 | 1.4 | 2.0 | 2.0 | 1.9 |
| MnO | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| FeO | 3.0 | 7.4 | 2.6 | 2.8 | 4.1 | 4.0 | 4.0 |
| NiO | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Cl | 0.1 | 0.4 | 0.1 | 0.1 | 0.5 | 0.5 | 0.5 |
| Total | 96.5 | 95.5 | 96.3 | 96.2 | 95.7 | 95.8 | 96.2 |
| Number of ions on the basis of 24 O | | | | | | | |
| Na | 0.1 | 0.3 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 |
| Mg | 4.8 | 4.5 | 5.1 | 5.0 | 4.7 | 4.7 | 4.7 |
| Al | 2.6 | 2.7 | 3.0 | 2.8 | 2.4 | 2.4 | 2.5 |
| Si | 5.5 | 5.5 | 5.6 | 5.7 | 5.6 | 5.6 | 5.6 |
| K | 1.9 | 1.7 | 1.4 | 1.4 | 1.8 | 1.8 | 1.8 |
| Ca | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ti | 0.5 | 0.2 | 0.1 | 0.1 | 0.5 | 0.5 | 0.6 |
| Cr | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.4 | 0.9 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OH | 3.3 | 4.0 | 3.4 | 3.5 | 3.7 | 3.6 | 3.2 |
| Cl | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| | | | | | | | |
| Σ(Al,Si) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Σ(Ca,Na,K) | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 |
| Σ(Fe,Mg,Al,Ti,Cr) | 6.0 | 6.0 | 6.2 | 6.1 | 6.0 | 6.0 | 6.1 |
| Σ(OH,Cl) | 3.3 | 4.1 | 3.4 | 3.6 | 3.8 | 3.7 | 3.3 |

***Table 15*** *Selected amphibole analyses: Edenitic hornblende (1,3,5-9) & tremolite (2,4)*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| $Na_2O$ | 2.6 | 0.6 | 2.5 | 0.6 | 2.6 | 2.7 | 2.7 | 2.8 | 2.4 |
| MgO | 17.8 | 16.5 | 17.9 | 15.9 | 17.3 | 17.7 | 17.7 | 17.5 | 18.5 |
| $Al_2O_3$ | 11.4 | 4.5 | 10.1 | 3.1 | 11.0 | 11.1 | 11.3 | 11.6 | 11.7 |
| $SiO_2$ | 44.4 | 52.2 | 45.2 | 53.0 | 44.5 | 45.1 | 44.2 | 44.3 | 46.0 |
| $K_2O$ | 0.6 | 0.1 | 0.4 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 |
| CaO | 12.4 | 11.2 | 12.3 | 12.0 | 12.2 | 12.5 | 12.3 | 12.3 | 12.5 |
| $TiO_2$ | 2.4 | 0.1 | 2.3 | 0.1 | 2.3 | 2.4 | 2.7 | 2.6 | 0.9 |
| $Cr_2O_3$ | 2.2 | 0.7 | 2.0 | 0.4 | 2.1 | 2.1 | 2.0 | 2.0 | 1.7 |
| MnO | 0.0 | 0.4 | 0.0 | 0.5 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| FeO | 4.4 | 11.0 | 4.2 | 11.0 | 5.0 | 4.6 | 4.4 | 4.6 | 4.0 |
| NiO | 0.1 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| Total | 98.0 | 97.3 | 97.0 | 96.8 | 97.4 | 98.5 | 97.6 | 98.1 | 97.9 |
| Number of cations based on 24 O | | | | | | | | | |
| Na | 0.8 | 0.2 | 0.8 | 0.2 | 0.8 | 0.8 | 0.8 | 0.9 | 0.7 |
| Mg | 3.8 | 3.5 | 3.8 | 3.4 | 3.7 | 3.8 | 3.8 | 3.7 | 3.9 |
| Al | 1.9 | 0.8 | 1.7 | 0.5 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 |
| Si | 6.4 | 7.4 | 6.4 | 7.5 | 6.4 | 6.5 | 6.3 | 6.4 | 6.5 |
| K | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 1.9 | 1.7 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| Ti | 0.3 | 0.0 | 0.2 | 0.0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.1 |
| Cr | 0.2 | 0.1 | 0.2 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Mn | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.5 | 1.3 | 0.5 | 1.3 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OH | 1.9 | 2.5 | 2.9 | 3.0 | 2.5 | 1.5 | 2.3 | 1.8 | 2.0 |
| | | | | | | | | | |
| Σ(Al,Si) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Σ(Ca,Na,K) | 2.8 | 1.9 | 2.7 | 2.0 | 2.7 | 2.8 | 2.8 | 2.8 | 2.7 |
| Σ(Fe,Mg,Al,Ti,Cr) | 5.2 | 5.1 | 4.9 | 4.8 | 5.0 | 5.3 | 5.0 | 5.2 | 5.2 |

***Table 16*** *Selected pumpellyite analyses.*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $Na_2O$ | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 |
| MgO | 1.0 | 4.3 | 3.7 | 3.3 | 3.6 | 3.9 |
| $Al_2O_3$ | 27.2 | 24.5 | 26.1 | 26.6 | 26.3 | 25.8 |
| $SiO_2$ | 37.4 | 37.4 | 37.6 | 37.7 | 37.7 | 37.6 |
| $K_2O$ | -0.0 | 0.0 | 0.0 | -0.0 | 0.0 | -0.0 |
| CaO | 23.1 | 23.0 | 23.5 | 23.5 | 23.8 | 23.5 |
| $TiO_2$ | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| $Cr_2O_3$ | 0.2 | 1.4 | 0.4 | 0.3 | 0.3 | 0.4 |
| MnO | 0.4 | 0.2 | 0.4 | 0.6 | 0.2 | 0.1 |
| FeO | 4.3 | 1.9 | 1.9 | 1.9 | 2.1 | 1.8 |
| NiO | -0.0 | 0.1 | -0.0 | 0.0 | 0.0 | 0.1 |
| Total | 93.9 | 93.1 | 93.7 | 94.1 | 94.2 | 93.4 |
| Number of ions based on 14 O | | | | | | |
| Na | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mg | 0.1 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 |
| Al | 2.6 | 2.3 | 2.5 | 2.5 | 2.5 | 2.4 |
| Si | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OH | 3.3 | 3.7 | 3.4 | 3.2 | 3.1 | 3.5 |
| | | | | | | |
| Si | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Σ(Ca,Na,K) | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 |
| Σ($Fe^{2+}$Mg,Al) | 3.0 | 3.1 | 3.1 | 3.1 | 3.1 | 3.0 |

***Table 17*** *Selected epidote (1-3) and prehnite (4) analyses.*

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Na | 0.2 | 0.4 | 0.1 | 0.2 |
| Mg | 0.3 | 4.6 | 0.8 | 0.0 |
| Al | 29.7 | 26.8 | 29.6 | 24.3 |
| Si | 38.5 | 40.1 | 38.3 | 43.9 |
| K | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 23.3 | 23.9 | 23.4 | 27.2 |
| Ti | 0.1 | 0.1 | 0.0 | 0.0 |
| Cr | 0.5 | 0.3 | 0.6 | 0.0 |
| Mn | 0.2 | 0.1 | 0.3 | 0.1 |
| Fe2+ | 4.8 | 2.2 | 4.5 | 0.2 |
| Ni | 0.1 | 0.0 | 0.0 | 0.1 |
| Total | 97.5 | 98.2 | 97.4 | 96.2 |
| Number of ions based on 12.5 O for epidote and 24 O for prehnite | | | | |
| Na | 0.0 | 0.1 | 0.0 | 0.1 |
| Mg | 0.0 | 0.5 | 0.1 | 0.0 |
| Al | 2.6 | 2.3 | 2.6 | 4.0 |
| Si | 2.9 | 3.0 | 2.8 | 6.1 |
| K | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 1.9 | 1.9 | 1.9 | 4.0 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.0 | 0.0 | 0.0 |
| Fe2+ | 0.3 | 0.1 | 0.3 | 0.0 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 |
| OH | 1.2 | 0.9 | 1.3 | 3.7 |
| | | | | |
| Σ(Si,Al) | 3.0 | 3.0 | 3.0 | 6.0 |
| Σ(Ca,Na,K) | 1.9 | 2.0 | 1.9 | 4.1 |
| Σ($Fe^{2+}$Mg,Al) | 2.8 | 3.0 | 2.8 | 4.0 |

***Table 18*** *Selected chlorite (1-2),septechlorite (3-5), serpentine (6-8) and talc (9-10) analyses.*

| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|
| Na | 0.7 | 0.7 | 0.5 | 0.6 | 0.6 | 0.4 | 0.5 | 0.3 | 0.5 | 0.5 |
| Mg | 21.6 | 21.3 | 23.7 | 23.4 | 23.3 | 38.6 | 36.0 | 41.0 | 29.6 | 28.8 |
| Al | 12.9 | 12.2 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 | -0.1 | 6.6 | 4.7 |
| Si | 36.5 | 37.8 | 55.2 | 54.4 | 55.3 | 42.6 | 43.8 | 43.5 | 51.1 | 54.1 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -0.1 | 0.0 | 0.1 | 0.1 |
| Ca | 4.7 | 5.1 | 0.6 | 0.6 | 0.5 | 0.2 | 0.3 | 0.0 | 0.1 | 0.4 |
| Ti | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 2.3 | 2.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.3 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Fe | 11.7 | 11.8 | 11.1 | 11.0 | 11.8 | 4.6 | 6.0 | 1.8 | 5.8 | 5.1 |
| Ni | 0.1 | 0.1 | 0.5 | 0.5 | 0.4 | 0.2 | 0.1 | 0.4 | 0.0 | 0.0 |
| Total | 90.8 | 91.6 | 91.8 | 90.7 | 92.3 | 86.9 | 86.8 | 86.8 | 94.8 | 94.6 |
| Number of ions based on 36 O for chlorite, 18 O for septechlorite, 9 O for serpentine, and 24 O for talc | | | | | | | | | | |
| Na | 0.3 | 0.3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 |
| Mg | 6.5 | 6.5 | 3.5 | 3.4 | 3.4 | 2.7 | 2.5 | 2.8 | 5.8 | 5.6 |
| Al | 3.1 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.7 |
| Si | 7.4 | 7.7 | 5.4 | 5.3 | 5.4 | 2.0 | 2.1 | 2.0 | 6.7 | 7.0 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ca | 1.0 | 1.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Ti | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cr | 0.4 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mn | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| $Fe^{2+}$ | 2.0 | 2.0 | 0.9 | 0.9 | 1.0 | 0.2 | 0.2 | 0.1 | 0.6 | 0.6 |
| Ni | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OH | 12.4 | 11.4 | 5.3 | 6.0 | 5.1 | 4.1 | 4.1 | 4.1 | 5.2 | 5.3 |
| Σ(Al,Si) | 8.0 | 8.0 | 4.0 | 4.0 | 4.0 | 2.0 | 2.0 | 2.0 | 7.7 | 7.7 |
| Σ(Fe,Mg,Al,Na,Ca,K) | 12.4 | 11.4 | 6.6 | 6.4 | 6.0 | 3.0 | 2.8 | 2.9 | 6.4 | 6.1 |

# APPENDIX F

*Electron-microprobe analyses of selected base-metal sulphide grains. Analytical conditions and minimum detection limits are discussed in Chapter 4.*

***Table 1*** *Chalcopyrite compositions from sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Avg. | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 34.49 | 34.61 | 35.04 | 35.19 | 35.00 | 35.07 | 34.77 | 35.25 | 35.23 | 35.25 | 35.03 | 34.57 | 35.01 | 34.80 | 34.90 | 34.65 | 34.92 | 34.94 | 34.80 | 35.18 | 34.93 | 0.24 |
| **Fe** | 30.36 | 30.61 | 30.49 | 30.29 | 30.78 | 30.22 | 30.95 | 30.66 | 30.60 | 30.97 | 30.45 | 30.71 | 29.98 | 29.97 | 30.34 | 30.48 | 30.07 | 30.40 | 30.19 | 30.22 | 30.44 | 0.29 |
| **Ni** | 0.04 | 0.00 | 0.39 | 0.02 | 0.00 | 0.00 | 0.03 | 0.02 | 0.07 | 0.01 | 0.41 | 0.03 | 0.01 | 0.01 | 0.03 | 0.00 | 0.00 | 0.01 | 0.03 | 0.01 | 0.06 | 0.12 |
| **Co** | 0.07 | 0.04 | 0.00 | 0.06 | 0.02 | 0.03 | 0.02 | 0.05 | 0.04 | 0.04 | 0.08 | 0.03 | 0.06 | 0.06 | 0.04 | 0.02 | 0.02 | 0.04 | 0.03 | 0.03 | 0.04 | 0.02 |
| **Cu** | 33.90 | 34.53 | 34.07 | 34.16 | 34.43 | 34.10 | 34.32 | 33.86 | 33.92 | 34.46 | 33.85 | 34.54 | 33.74 | 33.65 | 34.01 | 34.18 | 32.91 | 34.32 | 33.85 | 33.64 | 34.02 | 0.39 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | 0.03 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Total** | 98.86 | 99.83 | 99.99 | 99.71 | 100.24 | 99.42 | 100.09 | 99.84 | 99.87 | 100.73 | 99.83 | 99.88 | 98.80 | 98.49 | 99.33 | 99.33 | 97.93 | 99.71 | 98.90 | 99.09 | 99.49 | |
| Atomic proportions | | | | | | | | | | | | | | | | | | | | | | |
| **S** | 2.00 | 1.99 | 2.00 | 2.02 | 2.00 | 2.01 | 1.99 | 2.02 | 2.01 | 2.00 | 2.01 | 1.98 | 2.02 | 2.02 | 2.01 | 2.00 | 2.03 | 2.00 | 2.01 | 2.01 | 2.01 | 0.00 |
| **Fe** | 1.01 | 1.01 | 1.00 | 1.00 | 1.01 | 1.00 | 1.02 | 1.01 | 1.00 | 1.01 | 1.00 | 1.01 | 0.99 | 1.00 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| **Ni** | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.99 | 1.00 | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.98 | 0.98 | 0.99 | 0.98 | 1.00 | 0.98 | 0.98 | 0.99 | 0.99 | 0.97 | 0.99 | 0.99 | 0.99 | 0.99 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | 0.00 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |

***Table 2*** *Chalcopyrite compositions from sample B4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 34.80 | 34.96 | 35.05 | 34.80 | 35.23 | 35.26 | 34.98 | 34.92 | 35.67 | 35.04 | 34.98 | 35.11 | 34.74 | 35.04 | 0.24 |
| **Fe** | 30.50 | 31.00 | 29.93 | 30.06 | 30.33 | 30.68 | 30.59 | 31.40 | 30.95 | 30.17 | 30.43 | 30.31 | 30.65 | 30.54 | 0.41 |
| **Ni** | 0.03 | 0.01 | 0.09 | 0.08 | 0.26 | 0.04 | 0.06 | 0.06 | 0.02 | 0.01 | 0.23 | 0.02 | 0.01 | 0.07 | 0.08 |
| **Co** | 0.03 | 0.05 | 0.05 | 0.05 | 0.04 | 0.02 | 0.04 | 0.03 | 0.03 | 0.03 | 0.04 | 0.02 | 0.06 | 0.04 | 0.01 |
| **Cu** | 33.54 | 34.62 | 33.07 | 33.39 | 33.81 | 34.47 | 33.99 | 33.37 | 34.21 | 33.56 | 34.60 | 34.12 | 34.24 | 33.92 | 0.50 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Total** | 98.90 | 100.64 | 98.19 | 98.38 | 99.67 | 100.47 | 99.66 | 99.79 | 100.88 | 98.82 | 100.27 | 99.59 | 99.70 | 99.61 | |
| Atomic proportions | | | | | | | | | | | | | | | |
| **S** | 2.01 | 1.99 | 2.03 | 2.02 | 2.02 | 2.01 | 2.01 | 2.00 | 2.02 | 2.02 | 2.00 | 2.01 | 1.99 | 2.01 | 0.01 |
| **Fe** | 1.01 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.03 | 1.01 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 0.01 |
| **Ni** | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.98 | 0.99 | 0.97 | 0.98 | 0.98 | 0.99 | 0.98 | 0.96 | 0.98 | 0.98 | 1.00 | 0.99 | 0.99 | 0.98 | 0.01 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |

***Table 3*** *Chalcopyrite compositions from sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 35.46 | 34.92 | 34.73 | 34.78 | 34.86 | 34.92 | 35.24 | 35.10 | 35.01 | 34.54 | 34.85 | 34.75 | 34.76 | 34.95 | 34.93 | 34.28 | 34.83 | 34.94 | 34.28 | 35.10 | 33.90 | 34.81 | 0.47 |
| **Fe** | 30.73 | 29.79 | 30.10 | 29.68 | 30.49 | 30.48 | 30.40 | 30.80 | 30.18 | 29.84 | 29.85 | 30.11 | 29.82 | 30.02 | 30.19 | 30.03 | 30.59 | 30.21 | 30.22 | 30.23 | 30.67 | 30.21 | 0.46 |
| **Ni** | 0.02 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.04 | 0.08 | 0.00 | 0.00 | 0.04 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.05 | 0.02 | 0.00 | 0.02 | 0.02 |
| **Co** | 0.03 | 0.03 | 0.06 | 0.03 | 0.04 | 0.06 | 0.00 | 0.05 | 0.04 | 0.04 | 0.05 | 0.02 | 0.04 | 0.03 | 0.04 | 0.04 | 0.05 | 0.05 | 0.03 | 0.05 | 0.02 | 0.04 | 0.02 |
| **Cu** | 34.49 | 33.81 | 34.05 | 33.61 | 34.34 | 34.00 | 34.21 | 33.89 | 34.26 | 33.43 | 33.74 | 33.43 | 33.51 | 33.70 | 33.95 | 34.10 | 33.88 | 33.76 | 33.86 | 34.34 | 34.04 | 33.92 | 0.64 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 100.72 | 98.64 | 98.94 | 98.10 | 99.72 | 99.46 | 99.86 | 99.84 | 99.53 | 97.92 | 98.50 | 98.31 | 98.16 | 98.70 | 99.10 | 98.45 | 99.36 | 98.97 | 98.43 | 99.73 | 98.63 | 99.00 | |
| Atomic proportions | | | | | | | | | | | | | | | | | | | | | | | |
| **S** | 2.01 | 2.02 | 2.01 | 2.02 | 2.00 | 2.01 | 2.01 | 2.01 | 2.01 | 2.01 | 2.02 | 2.02 | 2.02 | 2.02 | 2.01 | 1.99 | 2.00 | 2.02 | 1.99 | 2.01 | 1.97 | 2.01 | 0.00 |
| **Fe** | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.01 | 1.00 | 1.01 | 0.99 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.01 | 1.00 | 1.01 | 0.99 | 1.03 | 1.00 | 0.00 |
| **Ni** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.98 | 0.99 | 0.98 | 0.99 | 0.98 | 0.98 | 0.98 | 0.99 | 1.00 | 0.98 | 0.98 | 0.99 | 0.99 | 1.00 | 0.99 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |

***Table 4*** *Pyrrhotite compositions from sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | x | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 36.28 | 36.27 | 36.40 | 36.56 | 36.41 | 36.34 | 36.38 | 36.18 | 36.86 | 37.78 | 36.36 | 36.32 | 36.33 | 36.02 | 36.84 | 36.84 | 36.66 | 36.73 | 36.53 | 0.40 |
| **Fe** | 62.76 | 62.54 | 63.14 | 62.75 | 62.61 | 63.14 | 62.69 | 63.02 | 63.54 | 61.94 | 62.76 | 63.39 | 62.63 | 62.33 | 62.83 | 63.36 | 62.94 | 63.38 | 62.87 | 0.41 |
| **Ni** | 0.02 | 0.04 | 0.09 | 0.04 | 0.03 | 0.01 | 0.01 | 0.02 | 0.03 | 0.28 | 0.09 | 0.06 | 0.07 | 0.03 | 0.00 | 0.02 | 0.01 | 0.04 | 0.05 | 0.06 |
| **Co** | 0.06 | 0.08 | 0.07 | 0.13 | 0.07 | 0.08 | 0.08 | 0.04 | 0.08 | 0.08 | 0.05 | 0.10 | 0.07 | 0.05 | 0.11 | 0.08 | 0.06 | 0.06 | 0.07 | 0.02 |
| **Cu** | 0.02 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.00 | 0.05 | 0.03 | 0.00 | 0.03 | 0.03 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.04 | 0.02 | 0.01 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pd** | 0.02 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.04 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.02 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Total** | 99.16 | 98.93 | 99.72 | 99.50 | 99.16 | 99.57 | 99.17 | 99.31 | 100.53 | 100.09 | 99.30 | 99.89 | 99.15 | 98.46 | 99.78 | 100.29 | 99.67 | 100.25 | 99.55 | |
| Atomic proportions | | | | | | | | | | | | | | | | | | | | |
| **S** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| **Fe** | 0.99 | 0.99 | 1.00 | 0.99 | 0.99 | 1.00 | 0.99 | 1.00 | 0.99 | 0.94 | 0.99 | 1.00 | 0.99 | 0.99 | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.00 |
| **Ni** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pd** | 0.00 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.00 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.00 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |

***Table 5*** *Pyrrhotite compositions from sample B4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 39.14 | 38.89 | 39.06 | 39.49 | 39.31 | 39.12 | 38.97 | 39.08 | 39.06 | 38.49 | 38.84 | 37.64 | 38.85 | 38.81 | 39.51 | 38.95 | 39.14 | 38.60 | 37.85 |
| **Fe** | 60.09 | 61.06 | 61.12 | 60.82 | 61.34 | 60.79 | 60.75 | 60.18 | 60.80 | 60.10 | 60.60 | 60.82 | 60.52 | 60.35 | 59.52 | 61.11 | 60.59 | 59.54 | 60.31 |
| **Ni** | 0.02 | 0.25 | 0.11 | 0.04 | 0.09 | 0.06 | 0.04 | 0.20 | 0.10 | 1.05 | 0.17 | 0.19 | 0.12 | 0.04 | 0.14 | 0.05 | 0.09 | 0.11 | 0.13 |
| **Co** | 0.06 | 0.08 | 0.04 | 0.08 | 0.04 | 0.03 | 0.09 | 0.05 | 0.04 | 0.13 | 0.08 | 0.08 | 0.09 | 0.06 | 0.03 | 0.03 | 0.08 | 0.05 | 0.07 |
| **Cu** | 0.01 | 0.00 | 0.00 | 0.03 | 0.02 | 0.00 | 0.01 | 0.03 | 0.02 | 0.14 | 0.08 | 0.00 | 0.06 | 0.04 | 0.05 | 0.01 | 0.06 | 0.02 | 0.03 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Total** | 99.32 | 100.28 | 100.34 | 100.46 | 100.81 | 100.00 | 99.85 | 99.54 | 100.02 | 99.91 | 99.76 | 98.74 | 99.63 | 99.31 | 99.24 | 100.15 | 99.96 | 98.32 | 98.40 |
| Atomic proportions | | | | | | | | | | | | | | | | | | | |
| **S** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| **Fe** | 0.88 | 0.90 | 0.90 | 0.88 | 0.90 | 0.89 | 0.90 | 0.88 | 0.89 | 0.90 | 0.90 | 0.93 | 0.89 | 0.89 | 0.86 | 0.90 | 0.89 | 0.89 | 0.91 |
| **Ni** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |

***Table 5 continued.*** *Pyrrhotite compositions from sample B4*

| | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 39.39 | 37.97 | 38.55 | 38.65 | 38.52 | 38.76 | 38.54 | 38.54 | 38.80 | 0.46 |
| **Fe** | 60.91 | 61.14 | 60.08 | 60.11 | 60.71 | 60.83 | 60.98 | 60.17 | 60.57 | 0.48 |
| **Ni** | 0.08 | 0.14 | 0.01 | 0.07 | 0.06 | 0.05 | 0.16 | 0.07 | 0.13 | 0.19 |
| **Co** | 0.07 | 0.06 | 0.10 | 0.03 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.02 |
| **Cu** | 0.00 | 0.03 | 0.02 | 0.02 | 0.03 | 0.02 | 0.01 | 0.00 | 0.03 | 0.03 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Total** | 100.45 | 99.33 | 98.77 | 98.87 | 99.39 | 99.73 | 99.74 | 98.84 | 99.60 | |
| Atomic proportions | | | | | | | | | | |
| **S** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| **Fe** | 0.89 | 0.92 | 0.89 | 0.89 | 0.90 | 0.90 | 0.91 | 0.90 | 0.90 | 0.00 |
| **Ni** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |

***Table 6*** *Pyrite compositions from sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Agv. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 53.75 | 53.69 | 53.49 | 52.43 | 53.78 | 52.96 | 54.21 | 53.78 | 54.35 | 53.63 | 53.60 | 0.56 |
| **Fe** | 45.88 | 45.00 | 45.75 | 46.31 | 45.93 | 45.33 | 45.85 | 45.67 | 46.21 | 45.09 | 45.70 | 0.44 |
| **Ni** | 0.42 | 0.42 | 0.13 | 0.72 | 0.02 | 0.09 | 0.01 | 0.19 | 0.05 | 0.02 | 0.21 | 0.24 |
| **Co** | 1.00 | 1.48 | 0.70 | 0.70 | 1.35 | 2.19 | 1.21 | 0.54 | 1.11 | 1.48 | 1.18 | 0.49 |
| **Cu** | 0.02 | 0.02 | 0.04 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.08 | 0.00 | 0.02 | 0.03 |
| **Rh** | b.d.l. | 0.06 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 101.07 | 100.66 | 100.11 | 100.17 | 101.07 | 100.56 | 101.29 | 100.19 | 101.80 | 100.21 | 100.71 | |
| Atomic proportions | | | | | | | | | | | | |
| **S** | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| **Fe** | 0.98 | 0.96 | 0.98 | 1.01 | 0.98 | 0.98 | 0.97 | 0.98 | 0.98 | 0.97 | 0.98 | 0.01 |
| **Ni** | 0.01 | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.02 | 0.03 | 0.01 | 0.01 | 0.03 | 0.04 | 0.02 | 0.01 | 0.02 | 0.03 | 0.02 | 0.01 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | 0.0216 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |

***Table 7*** *Pyrite compositions from sample B4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | Avg. | s |
|---|---|---|---|---|---|---|---|---|
| **S** | 54.11 | 52.03 | 54.32 | 53.71 | 53.77 | 53.96 | 53.65 | 0.82 |
| **Fe** | 47.84 | 46.39 | 47.52 | 46.90 | 47.37 | 46.99 | 47.17 | 0.51 |
| **Ni** | 0.00 | 0.01 | 0.02 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 |
| **Co** | 0.03 | 0.04 | 0.09 | 0.08 | 0.04 | 0.06 | 0.06 | 0.02 |
| **Cu** | 0.02 | 0.03 | 0.00 | 0.17 | 0.30 | 0.03 | 0.09 | 0.12 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Total** | 102.00 | 98.51 | 101.94 | 100.92 | 101.50 | 101.06 | 100.99 | |
| Atomic proportions | | | | | | | | |
| **S** | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| **Fe** | 1.02 | 1.02 | 1.00 | 1.00 | 1.01 | 1.00 | 1.01 | 0.01 |
| **Ni** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Co** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |

***Table 8*** *Pyrite compositions from sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 53.10 | 53.55 | 52.19 | 53.06 | 53.26 | 52.27 | 52.76 | 52.67 | 52.61 | 53.78 | 54.08 | 53.64 | 53.86 | 53.25 | 53.12 | 53.50 | 52.31 | 52.71 | 53.10 | 0.57 |
| **Fe** | 46.60 | 46.97 | 47.17 | 46.30 | 46.27 | 46.48 | 46.19 | 46.80 | 46.18 | 46.84 | 43.51 | 47.13 | 46.86 | 44.43 | 46.07 | 46.65 | 46.23 | 46.43 | 46.28 | 0.92 |
| **Ni** | 0.70 | 0.01 | 0.02 | 0.00 | 0.05 | 0.00 | 0.15 | 0.91 | 0.76 | 0.17 | 0.62 | 0.07 | 0.08 | 0.14 | 0.94 | 0.14 | 1.71 | 0.53 | 0.39 | 0.47 |
| **Co** | 0.59 | 0.04 | 0.11 | 0.98 | 1.31 | 0.10 | 0.67 | 0.09 | 0.17 | 0.05 | 1.57 | 0.15 | 0.45 | 0.48 | 0.12 | 0.37 | 0.38 | 0.04 | 0.43 | 0.45 |
| **Cu** | 0.05 | 0.02 | 0.00 | 0.04 | 0.06 | 0.02 | 0.03 | 0.00 | 0.02 | 0.01 | 0.02 | 0.04 | 0.04 | 0.03 | 0.05 | 0.05 | 0.03 | 0.00 | 0.03 | 0.02 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Total** | 101.04 | 100.60 | 99.49 | 100.38 | 100.94 | 98.86 | 99.80 | 100.48 | 99.75 | 100.85 | 99.81 | 101.03 | 101.29 | 98.33 | 100.29 | 100.70 | 100.65 | 99.71 | 100.22 | |
| Atomic proportions | | | | | | | | | | | | | | | | | | | | |
| **S** | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| **Fe** | 1.01 | 1.01 | 1.04 | 1.00 | 1.00 | 1.02 | 1.01 | 1.02 | 1.01 | 1.00 | 0.92 | 1.01 | 1.00 | 0.96 | 1.00 | 1.00 | 1.01 | 1.01 | 1.00 | 0.02 |
| **Ni** | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.04 | 0.01 | 0.01 | 0.01 |
| **Co** | 0.01 | 0.00 | 0.00 | 0.02 | 0.03 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |

***Table 9*** *Pyrite compositions from sample C2.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 53.70 | 53.90 | 53.94 | 53.35 | 53.33 | 53.75 | 53.65 | 53.73 | 53.58 | 53.70 | 52.64 | 53.52 | 53.57 | 0.35 |
| **Fe** | 46.09 | 45.69 | 46.47 | 46.05 | 46.99 | 45.32 | 45.24 | 44.32 | 46.04 | 45.56 | 45.00 | 46.44 | 45.77 | 0.73 |
| **Ni** | 0.68 | 0.08 | 0.21 | 0.46 | 0.07 | 0.35 | 0.50 | 0.98 | 0.13 | 0.21 | 0.28 | 0.10 | 0.34 | 0.28 |
| **Co** | 0.65 | 1.59 | 0.74 | 0.68 | 0.08 | 1.57 | 1.22 | 1.52 | 0.99 | 1.55 | 1.14 | 0.95 | 1.06 | 0.47 |
| **Cu** | 0.01 | 0.00 | 0.03 | 0.11 | 0.01 | 0.03 | 0.01 | 0.83 | 0.00 | 0.06 | 0.02 | 0.06 | 0.10 | 0.23 |
| **Rh** | b.d.l. | 0.0216 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.1096 | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 101.13 | 101.29 | 101.38 | 100.66 | 100.48 | 101.02 | 100.62 | 101.38 | 100.73 | 101.08 | 99.08 | 101.20 | 100.83 | |
| Atomic proportions | | | | | | | | | | | | | | |
| **S** | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| **Fe** | 0.99 | 0.97 | 0.99 | 0.99 | 1.01 | 0.97 | 0.97 | 0.95 | 0.99 | 0.97 | 0.98 | 1.00 | 0.98 | 0.02 |
| **Ni** | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| **Co** | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.01 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | 0.0001 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.0004 | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |

***Table 10*** *Millerite compositions from sample C1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 36.11 | 34.69 | 34.84 | 34.67 | 34.84 | 34.51 | 34.44 | 35.13 | 35.10 | 35.61 | 35.99 | 35.38 | 35.34 | 35.63 | 35.19 | 35.44 | 35.05 | 35.44 | 35.35 | 35.56 | 35.22 | 0.46 |
| **Fe** | 1.04 | 1.27 | 0.83 | 1.27 | 1.02 | 0.86 | 0.98 | 1.14 | 1.08 | 3.30 | 1.24 | 1.56 | 0.69 | 1.24 | 1.03 | 2.31 | 1.26 | 0.95 | 0.83 | 1.10 | 1.25 | 0.59 |
| **Ni** | 63.32 | 61.20 | 62.75 | 61.68 | 62.02 | 61.94 | 62.18 | 62.56 | 61.34 | 60.61 | 61.42 | 61.73 | 63.23 | 62.22 | 62.77 | 63.62 | 61.56 | 61.84 | 63.73 | 61.23 | 62.15 | 0.87 |
| **Co** | 0.92 | 1.02 | 1.02 | 1.06 | 0.89 | 1.00 | 1.13 | 1.01 | 0.62 | 0.78 | 1.00 | 0.90 | 0.63 | 1.16 | 0.81 | 0.20 | 1.20 | 0.95 | 1.12 | 1.00 | 0.92 | 0.23 |
| **Cu** | 0.06 | 0.06 | 0.07 | 0.05 | 0.06 | 0.05 | 0.06 | 0.06 | 0.05 | 0.06 | 0.04 | 0.08 | 0.06 | 0.06 | 0.00 | 0.04 | 0.08 | 0.06 | 0.07 | 0.02 | 0.05 | 0.02 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.0274 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Total** | 101.47 | 98.25 | 99.51 | 98.74 | 98.82 | 98.39 | 98.80 | 99.91 | 98.19 | 100.36 | 99.70 | 99.66 | 99.96 | 100.32 | 99.81 | 101.61 | 99.14 | 99.24 | 101.10 | 98.91 | 99.59 | |
| Atomic proportions | | | | | | | | | | | | | | | | | | | | | | |
| **S** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| **Fe** | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.05 | 0.02 | 0.03 | 0.01 | 0.02 | 0.02 | 0.04 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.01 |
| **Ni** | 0.96 | 0.96 | 0.98 | 0.97 | 0.97 | 0.98 | 0.99 | 0.97 | 0.95 | 0.93 | 0.93 | 0.95 | 0.98 | 0.95 | 0.97 | 0.98 | 0.96 | 0.95 | 0.98 | 0.94 | 0.96 | 0.02 |
| **Co** | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.00 | 0.02 | 0.01 | 0.02 | 0.02 | 0.01 | 0.00 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.0001 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | |

***Table 11*** *Millerite compositions from sample C2.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 35.13 | 35.38 | 35.69 | 35.42 | 35.46 | 35.06 | 35.48 | 35.45 | 35.12 | 35.33 | 35.35 | 0.20 |
| **Fe** | 1.69 | 3.27 | 0.87 | 0.88 | 0.86 | 1.26 | 1.00 | 0.97 | 1.26 | 1.24 | 1.33 | 0.73 |
| **Ni** | 61.94 | 61.64 | 61.88 | 63.90 | 62.20 | 62.20 | 61.98 | 62.47 | 62.01 | 61.17 | 62.14 | 0.71 |
| **Co** | 0.80 | 0.08 | 1.20 | 0.01 | 1.12 | 0.03 | 1.01 | 1.04 | 0.60 | 0.95 | 0.68 | 0.48 |
| **Cu** | 0.06 | 0.03 | 0.02 | 0.11 | 0.05 | 0.06 | 0.09 | 0.00 | 0.04 | 0.06 | 0.05 | 0.03 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 99.62 | 100.40 | 99.66 | 100.32 | 99.69 | 98.61 | 99.56 | 99.92 | 99.02 | 98.75 | 99.56 | |
| Atomic proportions | | | | | | | | | | | | |
| **S** | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| **Fe** | 0.03 | 0.05 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| **Ni** | 0.96 | 0.95 | 0.95 | 0.99 | 0.96 | 0.97 | 0.95 | 0.96 | 0.96 | 0.95 | 0.96 | 0.01 |
| **Co** | 0.01 | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |

***Table 12*** *Pentlandite compositions from sample A1.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 33.05 | 33.25 | 32.95 | 32.94 | 32.89 | 32.90 | 32.91 | 33.02 | 32.88 | 32.87 | 32.85 | 33.00 | 32.97 | 32.97 | 33.03 | 32.50 | 33.18 |
| **Fe** | 33.11 | 33.82 | 33.20 | 32.48 | 33.15 | 33.14 | 32.33 | 32.78 | 31.70 | 33.09 | 33.16 | 33.00 | 33.05 | 32.77 | 32.82 | 33.56 | 32.74 |
| **Ni** | 32.46 | 32.47 | 33.46 | 33.17 | 32.83 | 33.98 | 32.78 | 32.97 | 33.00 | 33.64 | 32.25 | 32.24 | 30.96 | 32.41 | 32.06 | 32.54 | 32.90 |
| **Co** | 0.70 | 0.77 | 0.34 | 0.34 | 0.67 | 0.32 | 0.51 | 0.35 | 0.63 | 0.31 | 0.61 | 0.36 | 0.33 | 0.51 | 0.73 | 0.29 | 0.19 |
| **Cu** | 0.03 | 0.00 | 0.07 | 0.00 | 0.04 | 0.02 | 0.03 | 0.05 | 0.06 | 0.06 | 0.01 | 0.08 | 0.08 | 0.03 | 0.02 | 0.01 | 0.03 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | 0.7879 | b.d.l. | b.d.l. | 0.0381 | 0.0403 | 0.3194 | b.d.l. | 0.0614 | b.d.l. | 0.0611 | 0.0827 | 0.0486 | b.d.l. | b.d.l. |
| **Pd** | b.d.l. | 0.0299 | 0.0565 | b.d.l. | 0.1554 | 0.0901 | 0.2742 | 0.1289 | 0.3521 | 0.1972 | 0.2814 | 0.7425 | 1.0914 | 0.0472 | 0.0535 | 0.1647 | 0.2470 |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | 0.1016 | b.d.l. | b.d.l. | 0.0678 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Total** | 99.34 | 100.34 | 100.07 | 99.73 | 99.75 | 100.44 | 98.98 | 99.33 | 98.94 | 100.23 | 99.22 | 99.43 | 98.55 | 98.82 | 98.77 | 99.05 | 99.29 |
| Atomic proportions | | | | | | | | | | | | | | | | | |
| **S** | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 |
| **Fe** | 4.60 | 4.67 | 4.63 | 4.53 | 4.63 | 4.63 | 4.51 | 4.56 | 4.43 | 4.62 | 4.64 | 4.59 | 4.60 | 4.57 | 4.56 | 4.74 | 4.53 |
| **Ni** | 4.29 | 4.27 | 4.44 | 4.40 | 4.36 | 4.51 | 4.35 | 4.36 | 4.39 | 4.47 | 4.29 | 4.27 | 4.10 | 4.30 | 4.24 | 4.37 | 4.33 |
| **Co** | 0.09 | 0.10 | 0.05 | 0.04 | 0.09 | 0.04 | 0.07 | 0.05 | 0.08 | 0.04 | 0.08 | 0.05 | 0.04 | 0.07 | 0.10 | 0.04 | 0.03 |
| **Cu** | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| **Pd** | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.02 | 0.05 | 0.08 | 0.00 | 0.00 | 0.01 | 0.02 |
| **Pt** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Ru** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

***Table 12 continued.*** *Pentlandite compositions from sample A1*

| | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 32.96 | 32.82 | 33.42 | 32.67 | 33.42 | 33.41 | 32.69 | 33.28 | 32.99 | 0.23 |
| **Fe** | 32.49 | 32.67 | 33.28 | 33.22 | 33.12 | 31.84 | 33.30 | 33.16 | 32.92 | 0.48 |
| **Ni** | 32.67 | 33.63 | 31.92 | 32.01 | 32.40 | 31.78 | 32.72 | 32.46 | 32.63 | 0.66 |
| **Co** | 0.34 | 0.45 | 0.40 | 0.57 | 0.36 | 0.44 | 0.22 | 0.58 | 0.45 | 0.16 |
| **Cu** | 0.05 | 0.07 | 0.11 | 0.03 | 0.00 | 0.05 | 0.03 | 0.06 | 0.04 | 0.03 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | 0.4121 | 0.1934 | 0.6091 | b.d.l. | b.d.l. | | |
| **Pd** | 0.0941 | 0.1051 | 0.7187 | 0.5838 | 0.1091 | 0.8845 | 0.0763 | 0.0663 | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 98.60 | 99.75 | 99.85 | 99.50 | 99.59 | 99.01 | 99.04 | 99.61 | 99.49 | |
| Atomic proportions | | | | | | | | | | |
| **S** | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 0.00 |
| **Fe** | 4.53 | 4.57 | 4.57 | 4.67 | 4.55 | 4.38 | 4.68 | 4.58 | 4.58 | 0.00 |
| **Ni** | 4.33 | 4.48 | 4.17 | 4.28 | 4.24 | 4.16 | 4.37 | 4.26 | 4.32 | 0.10 |
| **Co** | 0.04 | 0.06 | 0.05 | 0.08 | 0.05 | 0.06 | 0.03 | 0.08 | 0.06 | 0.02 |
| **Cu** | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| **Rh** | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 0.05 | 0.00 | 0.00 | | |
| **Pd** | 0.01 | 0.01 | 0.05 | 0.04 | 0.01 | 0.06 | 0.01 | 0.00 | | |
| **Pt** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| **Ru** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |

***Table 13*** *Pentlandite compositions from sample B4.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 33.37 | 33.66 | 33.84 | 33.33 | 33.32 | 33.70 | 33.64 | 33.62 | 33.47 | 33.53 | 33.52 | 33.54 | 32.56 | 33.34 | 33.52 | 33.42 | 33.13 |
| **Fe** | 34.07 | 33.83 | 34.61 | 33.66 | 33.86 | 34.83 | 34.18 | 34.24 | 34.04 | 32.08 | 33.53 | 33.73 | 32.78 | 34.46 | 33.39 | 34.00 | 34.09 |
| **Ni** | 32.37 | 33.34 | 32.08 | 32.18 | 31.59 | 31.02 | 32.40 | 32.02 | 31.24 | 33.46 | 31.64 | 31.27 | 32.45 | 31.44 | 31.24 | 31.85 | 31.39 |
| **Co** | 0.64 | 0.68 | 0.71 | 0.75 | 0.65 | 0.90 | 0.87 | 0.72 | 0.67 | 0.73 | 0.70 | 0.77 | 0.66 | 0.74 | 0.68 | 0.60 | 0.67 |
| **Cu** | 0.06 | 0.02 | 0.02 | 0.11 | 0.03 | 0.07 | 0.08 | 0.04 | 0.07 | 0.06 | 0.08 | 0.03 | 0.08 | 0.08 | 0.02 | 0.03 | 0.12 |
| **Rh** | b.d.l. | b.d.l. | b.d.l. | 0.0417 | 0.0314 | 0.0676 | b.d.l. | 0.0201 | 0.0286 | 0.0527 | 0.0937 | 0.1256 | b.d.l. | 0.0379 | 0.0953 | 0.0511 | 0.1422 |
| **Pd** | 0.1862 | 0.0440 | 0.2304 | 0.0815 | 0.3449 | 0.0289 | b.d.l. | 0.0583 | 0.2039 | 0.1273 | 0.2284 | 0.1782 | b.d.l. | 0.1698 | b.d.l. | 0.0212 | 0.1674 |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. |
| **Total** | 100.70 | 101.57 | 101.49 | 100.14 | 99.82 | 100.61 | 101.17 | 100.71 | 99.71 | 100.04 | 99.79 | 99.65 | 98.53 | 100.27 | 98.93 | 99.98 | 99.71 |
| Atomic proportions | | | | | | | | | | | | | | | | | |
| **S** | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 |
| **Fe** | 4.69 | 4.62 | 4.70 | 4.64 | 4.67 | 4.75 | 4.67 | 4.68 | 4.67 | 4.39 | 4.60 | 4.62 | 4.62 | 4.75 | 4.58 | 4.67 | 4.73 |
| **Ni** | 4.24 | 4.33 | 4.14 | 4.22 | 4.14 | 4.02 | 4.21 | 4.16 | 4.08 | 4.36 | 4.12 | 4.07 | 4.35 | 4.12 | 4.07 | 4.16 | 4.14 |
| **Co** | 0.08 | 0.09 | 0.09 | 0.10 | 0.08 | 0.12 | 0.11 | 0.09 | 0.09 | 0.10 | 0.09 | 0.10 | 0.09 | 0.10 | 0.09 | 0.08 | 0.09 |
| **Cu** | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 |
| **Rh** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| **Pd** | 0.01 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 |
| **Pt** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Ru** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

***Table 13 continued.*** *Pentlandite compositions from sample B4*

| | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | Avg. | s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 33.41 | 33.69 | 33.34 | 32.87 | 33.42 | 33.50 | 33.04 | 33.39 | 33.21 | 33.04 | 33.39 | 0.28 |
| **Fe** | 34.11 | 33.91 | 33.88 | 33.35 | 35.38 | 34.04 | 33.57 | 34.17 | 34.03 | 32.88 | 33.88 | 0.65 |
| **Ni** | 31.65 | 32.48 | 31.43 | 31.35 | 30.68 | 31.46 | 31.53 | 31.84 | 31.68 | 31.59 | 31.80 | 0.64 |
| **Co** | 0.73 | 0.61 | 0.67 | 0.67 | 0.68 | 0.67 | 0.73 | 0.69 | 0.80 | 1.37 | 0.73 | 0.14 |
| **Cu** | 0.03 | 0.02 | 0.04 | 0.05 | 0.05 | 0.02 | 0.06 | 0.00 | 0.05 | 0.06 | 0.05 | 0.03 |
| **Rh** | 0.0820 | b.d.l. | 0.0244 | b.d.l. | b.d.l. | 0.5864 | 0.0749 | 0.0382 | 0.0744 | 0.0239 | | |
| **Pd** | 0.1675 | 0.1342 | 0.1729 | 0.0746 | 0.2570 | 0.0511 | 0.2352 | 0.3564 | 0.2590 | 0.1329 | | |
| **Pt** | 0.0325 | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 100.21 | 100.84 | 99.55 | 98.36 | 100.48 | 100.33 | 99.24 | 100.48 | 100.10 | 99.10 | 100.05 | |
| Atomic proportions | | | | | | | | | | | | |
| **S** | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 0.00 |
| **Fe** | 4.69 | 4.62 | 4.67 | 4.66 | 4.86 | 4.67 | 4.67 | 4.70 | 4.71 | 4.57 | 4.67 | 0.08 |
| **Ni** | 4.14 | 4.21 | 4.12 | 4.17 | 4.01 | 4.10 | 4.17 | 4.17 | 4.17 | 4.18 | 4.15 | 0.08 |
| **Co** | 0.09 | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.10 | 0.09 | 0.10 | 0.18 | 0.10 | 0.02 |
| **Cu** | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 |
| **Rh** | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| **Pd** | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 |
| **Pt** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Ru** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

***Table 14*** *Pentlandite compositions from sample C1.*

| | 1 | 2 | 3 | 4 | Avg. | s |
|---|---|---|---|---|---|---|
| **S** | 32.71 | 33.08 | 32.58 | 32.81 | 32.79 | 0.21 |
| **Fe** | 30.19 | 30.73 | 30.60 | 30.98 | 30.62 | 0.33 |
| **Ni** | 34.86 | 34.77 | 34.04 | 33.69 | 34.34 | 0.57 |
| **Co** | 0.38 | 1.00 | 0.24 | 0.23 | 0.46 | 0.36 |
| **Cu** | 0.07 | 0.06 | 0.07 | 0.01 | 0.05 | 0.03 |
| **Rh** | b.d.l. | 0.0226 | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | 0.1111 | 0.3583 | 0.4059 | | |
| **Pt** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 98.21 | 99.77 | 97.88 | 98.14 | 98.28 | |
| Atomic proportions | | | | | | |
| **S** | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 0.00 |
| **Fe** | 4.24 | 4.27 | 4.31 | 4.34 | 4.29 | 0.04 |
| **Ni** | 4.66 | 4.59 | 4.57 | 4.49 | 4.58 | 0.07 |
| **Co** | 0.05 | 0.13 | 0.03 | 0.03 | 0.06 | 0.05 |
| **Cu** | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 |
| **Rh** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Pd** | 0.00 | 0.01 | 0.03 | 0.03 | 0.02 | 0.01 |
| **Pt** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Ru** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

***Table 15*** *Siegenite compositions from samples C1 and C2.*

| | 1 | 2 | 3 | 4 | 5 | 6 | Avg. | s |
|---|---|---|---|---|---|---|---|---|
| **S** | 42.12 | 41.43 | 41.22 | 41.55 | 41.78 | 41.80 | 41.65 | 0.32 |
| **Fe** | 3.71 | 1.57 | 1.12 | 1.15 | 0.76 | 0.87 | 1.53 | 1.10 |
| **Ni** | 32.84 | 32.40 | 33.97 | 33.06 | 32.56 | 32.60 | 32.90 | 0.57 |
| **Co** | 19.48 | 19.76 | 21.40 | 21.48 | 23.51 | 24.13 | 21.63 | 1.90 |
| **Cu** | 0.05 | 0.06 | 0.03 | 0.03 | 0.00 | 0.01 | 0.03 | 0.02 |
| **Rh** | b.d.l. | 3.5389 | 1.0506 | 0.1311 | b.d.l. | b.d.l. | | |
| **Pd** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Pt** | b.d.l. | b.d.l. | 0.7394 | 2.0687 | b.d.l. | b.d.l. | | |
| **Ru** | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | b.d.l. | | |
| **Total** | 98.21 | 98.75 | 99.53 | 99.47 | 98.62 | 99.42 | | |
| Atomic proportions | | | | | | | | |
| **S** | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 0.00 |
| **Fe** | 0.20 | 0.09 | 0.06 | 0.06 | 0.04 | 0.05 | 0.08 | 0.06 |
| **Ni** | 1.70 | 1.71 | 1.80 | 1.74 | 1.70 | 1.70 | 1.73 | 0.04 |
| **Co** | 1.01 | 1.04 | 1.13 | 1.13 | 1.22 | 1.26 | 1.13 | 0.10 |
| **Cu** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Rh** | 0.00 | 0.11 | 0.03 | 0.00 | 0.00 | 0.00 | | |
| **Pd** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| **Pt** | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 | 0.00 | | |
| **Ru** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |

# APPENDIX G

*Electron-microprobe analyses of selected PGE mineral grains.*

***Table 1*** Selected electron-microprobe analyses of cooperite.

***Table 2*** Selected electron-microprobe analyses of braggite and vysotskite.

***Table 3*** Selected electron-microprobe analyses of malanite.

***Table 4*** Selected electron-microprobe analyses of Pt-Fe alloy

***Table 5*** Electron-microprobe analyses of atheneite (1), kotulskite (2,4), and moncheite (3).

***Table 1*** *Selected electron-microprobe analyses of cooperite.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Avg. |
|---|---|---|---|---|---|---|---|---|
| S | 14.4 | 12.6 | 15.0 | 18.9 | 13.7 | 12.8 | 12.9 | 14.3 |
| Ru | 0.0 | 0.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Rh | 0.2 | 0.2 | 0.4 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 |
| Pd | 8.3 | 0.4 | 0.1 | 7.7 | 3.3 | 0.0 | 0.1 | 2.9 |
| Pt | 76.8 | 81.7 | 79.1 | 64.0 | 79.6 | 85.9 | 85.3 | 78.9 |
| Fe | 0.6 | 0.5 | 0.7 | 0.8 | 0.6 | 0.9 | 0.5 | 0.6 |
| Co | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ni | 0.3 | 5.0 | 2.7 | 8.0 | 0.9 | 0.8 | 1.7 | 2.8 |
| Cu | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Total | 101.0 | 100.8 | 98.9 | 99.9 | 98.8 | 101.0 | 101.1 | 100.2 |
| Atomic proportions | | | | | | | | |
| S | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Ru | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pd | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| Pt | 0.9 | 1.1 | 0.9 | 0.6 | 1.0 | 1.1 | 1.1 | 0.9 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Co | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ni | 0.0 | 0.2 | 0.1 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 |
| Cu | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

***Table 2*** *Selected electron-microprobe analyses of braggite and vysotskite.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 19.1 | 19.3 | 20.6 | 19.8 | 18.9 | 18.6 | 15.2 | 18.0 | 15.7 | 21.3 | 21.0 | 21.7 | 14.9 | 18.3 | 25.5 | 23.9 | 19.9 | 23.1 |
| Ru | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rh | 0.3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.3 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 |
| Pd | 22.6 | 28.2 | 44.4 | 27.3 | 28.6 | 31.8 | 15.7 | 19.6 | 13.5 | 20.9 | 35.9 | 32.6 | 11.5 | 32.1 | 54.8 | 55.3 | 48.8 | 53.0 |
| Pt | 53.1 | 43.1 | 26.7 | 45.2 | 45.7 | 44.0 | 64.6 | 53.5 | 68.5 | 47.4 | 36.5 | 35.3 | 72.0 | 44.7 | 7.0 | 15.2 | 24.6 | 15.6 |
| Fe | 0.8 | 0.5 | 0.7 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.8 | 0.4 | 0.5 | 0.5 | 0.2 | 1.9 | 0.4 | 0.4 | 0.9 |
| Co | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ni | 5.0 | 6.6 | 6.5 | 6.9 | 6.8 | 4.5 | 1.6 | 7.8 | 2.3 | 9.8 | 4.4 | 8.5 | 1.1 | 4.2 | 9.9 | 6.4 | 4.7 | 7.0 |
| Cu | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.2 |
| Total | 101.4 | 98.1 | 99.0 | 100.0 | 100.6 | 99.6 | 98.1 | 100.0 | 100.8 | 100.7 | 98.4 | 99.1 | 100.7 | 99.7 | 99.7 | 101.4 | 98.6 | 99.9 |
| Atomic proportions | | | | | | | | | | | | | | | | | | |
| S | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Ru | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pd | 0.4 | 0.4 | 0.7 | 0.4 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.2 | 0.5 | 0.7 | 0.7 | 0.7 | 0.7 |
| Pt | 0.5 | 0.4 | 0.2 | 0.4 | 0.4 | 0.2 | 0.7 | 0.5 | 0.7 | 0.4 | 0.3 | 0.3 | 0.8 | 0.4 | 0.0 | 0.1 | 0.2 | 0.1 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Co | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ni | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.3 | 0.1 | 0.2 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 |
| Cu | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

***Table 3*** *Selected electron-microprobe analyses of malanite.*

| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|
| As | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| S | 26.7 | 26.0 | 27.4 | 26.9 | 27.0 | 26.4 | 26.5 | 26.4 | 26.5 | 26.7 |
| Ru | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| Rh | 13.3 | 6.9 | 7.1 | 8.6 | 14.0 | 9.4 | 4.6 | 6.5 | 10.7 | 9.0 |
| Pd | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 |
| Pt | 41.6 | 47.1 | 38.6 | 46.1 | 40.6 | 42.0 | 42.8 | 47.8 | 42.2 | 43.2 |
| Fe | 1.0 | 0.8 | 3.9 | 1.6 | 0.8 | 0.9 | 2.1 | 0.9 | 1.6 | 1.5 |
| Co | 2.6 | 3.8 | 3.0 | 2.7 | 3.1 | 3.3 | 6.3 | 3.1 | 3.7 | 3.5 |
| Ni | 0.5 | 1.8 | 7.0 | 2.8 | 0.8 | 6.4 | 3.4 | 2.3 | 0.5 | 2.8 |
| Cu | 12.4 | 12.6 | 11.3 | 12.8 | 12.9 | 11.8 | 12.4 | 12.5 | 12.9 | 12.4 |
| Total | 98.3 | 99.2 | 98.4 | 101.7 | 99.5 | 100.3 | 98.3 | 99.8 | 98.6 | 99.3 |
| Atomic proportions | | | | | | | | | | |
| As | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| S | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Ru | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rh | 0.6 | 0.3 | 0.3 | 0.4 | 0.7 | 0.4 | 0.2 | 0.3 | 0.5 | 0.4 |
| Pd | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pt | 1.0 | 1.2 | 0.9 | 1.1 | 1.0 | 1.1 | 1.1 | 1.2 | 1.1 | 1.1 |
| Fe | 0.1 | 0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 |
| Co | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.5 | 0.3 | 0.3 | 0.3 |
| Ni | 0.0 | 0.2 | 0.6 | 0.2 | 0.1 | 0.5 | 0.3 | 0.2 | 0.0 | 0.2 |
| Cu | 1.0 | 1.1 | 0.9 | 1.0 | 1.1 | 1.0 | 1.0 | 1.0 | 1.1 | 1.0 |

***Table 4*** *Selected electron-microprobe analyses of Pt-Fe alloy.*

| | 1 | 2 | 3 |
|---|---|---|---|
| S | 0.1 | 0.1 | 0.3 |
| Ru | 0.0 | 0.0 | 0.0 |
| Rh | 0.2 | 0.3 | 0.5 |
| Pd | 0.1 | 0.2 | 0.2 |
| Pt | 89.0 | 86.7 | 86.4 |
| Pb | 0.4 | 0.4 | 0.5 |
| Bi | 0.0 | 0.2 | 0.1 |
| Fe | 9.4 | 9.3 | 9.7 |
| Co | 0.0 | 0.0 | 0.0 |
| Ni | 0.1 | 0.1 | 0.6 |
| Cu | 0.2 | 0.8 | 0.3 |
| Total | 99.5 | 98.2 | 98.7 |
| Atomic proportions | | | |
| S | 0.0 | 0.0 | 0.0 |
| Ru | 0.0 | 0.0 | 0.0 |
| Rh | 0.0 | 0.0 | 0.0 |
| Pd | 0.0 | 0.0 | 0.0 |
| Pt | 2.6 | 2.9 | 2.8 |
| Pb | 0.0 | 0.0 | 0.0 |
| Bi | 0.0 | 0.0 | 0.0 |
| Fe | 1.2 | 1.1 | 1.0 |
| Co | 0.0 | 0.0 | 0.0 |
| Ni | 0.0 | 0.0 | 0.0 |
| Cu | 0.1 | 0.0 | 0.1 |
| ΣPGE | 2.7 | 2.9 | 2.8 |
| Σ(Fe,Cu, Ni,Co) | 1.3 | 1.1 | 1.1 |
| Ni | 0.0 | 0.0 | 0.0 |
| Cu | 0.0 | 0.0 | 0.0 |
| ΣPGE | 2.8 | 0.9 | 1.0 |
| Σ(Te,Bi,Hg,As) | 1.2 | 2.0 | 3.0 |

* high total + low total

***Table 5*** *Electron-microprobe analyses of atheneite (1), kotulskite (2,4), and moncheite (3).*

| | 1* | 2 | 3+ | 4 |
|---|---|---|---|---|
| As | 22.0 | 0.0 | 0.1 | 0.0 |
| S | 0.0 | 0.0 | 0.1 | 0.1 |
| Ru | 0.0 | 0.0 | 0.0 | 0.0 |
| Rh | 0.0 | 0.0 | 0.6 | 0.0 |
| Pd | 64.0 | 38.9 | 8.4 | 35.7 |
| Te | 0.1 | 43.8 | 53.4 | 47.4 |
| Pt | 0.1 | 0.0 | 26.2 | 5.8 |
| Hg | 15.9 | 0.0 | 0.0 | 0.0 |
| Pb | 0.0 | 0.0 | 0.1 | 0.2 |
| Bi | 0.0 | 15.1 | 7.6 | 10.0 |
| Fe | 0.4 | 0.5 | 0.5 | 1.0 |
| Ni | 0.0 | 0.0 | 0.1 | 0.0 |
| Cu | 0.0 | 0.0 | 0.1 | 0.1 |
| Total | 102.4 | 98.5 | 97.2 | 100.2 |
| Atomic proportions | | | | |
| As | 1.2 | 0.0 | 0.0 | 0.0 |
| S | 0.0 | 0.0 | 0.0 | 0.0 |
| Ru | 0.0 | 0.0 | 0.0 | 0.0 |
| Rh | 0.0 | 0.0 | 0.0 | 0.0 |
| Pd | 2.4 | 0.9 | 0.3 | 0.8 |
| Te | 0.0 | 0.9 | 1.8 | 0.9 |
| Pt | 0.0 | 0.0 | 0.6 | 0.1 |
| Hg | 0.3 | 0.0 | 0.0 | 0.0 |
| Pb | 0.0 | 0.0 | 0.0 | 0.0 |
| Bi | 0.0 | 0.2 | 0.2 | 0.1 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 |
| Ni | 0.0 | 0.0 | 0.0 | 0.0 |
| Cu | 0.0 | 0.0 | 0.0 | 0.0 |
| ΣPGE | 2.8 | 0.9 | 1.0 | 0.9 |
| Σ(Te,Bi,Hg,As) | 1.2 | 2.0 | 3.0 | 2.0 |

* high total + low total

# APPENDIX H

*Mineralogical data for milled feed and flotation products*

***Table 1*** *Chromite grain-size distributions in fourteen UG2 chromitite samples milled to 80% <75µm (reported in area per cent).*

| Size class (µm) | A2 | B2 | A1 | B1 | A3 | B3 | A4 | B4 | A5 | C1 | C2 | C3 | C5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0-17.0* | 12 | 16 | 15 | 14 | 16 | 14 | 15 | 13 | 21 | 14 | 14 | 13 | 16 |
| *17.0-36.0* | 29 | 32 | 31 | 31 | 34 | 33 | 34 | 31 | 33 | 29 | 33 | 32 | 31 |
| *36.0-55.0* | 21 | 18 | 19 | 21 | 20 | 20 | 22 | 20 | 17 | 20 | 22 | 21 | 20 |
| *55.0-74.1* | 17 | 16 | 14 | 15 | 16 | 14 | 15 | 15 | 12 | 15 | 14 | 15 | 15 |
| *74.1-93.1* | 12 | 11 | 11 | 11 | 9 | 10 | 9 | 12 | 9 | 11 | 11 | 11 | 10 |
| *93.1-112.1* | 7 | 5 | 6 | 6 | 3 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 |
| *112.1-131.1* | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 2 |
| *131.1-150.1* | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| *150.1-169.1* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *169.1-188.1* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *188.1-207.2* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *107.2-226.2* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *>226.2* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Median* | 44 | 38 | 40 | 41 | 36 | 38 | 37 | 41 | 32 | 42 | 39 | 41 | 38 |

***Table 2*** *Silicate grain-size distributions in fourteen UG2 chromitite samples milled to 80% <75µm (reported in area per cent).*

| Size class (µm) | A2 | B2 | A1 | B1 | A3 | B3 | A4 | B4 | A5 | C1 | C2 | C3 | C5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0-17.0* | 23 | 28 | 28 | 27 | 29 | 30 | 32 | 29 | 36 | 30 | 30 | 31 | 27 |
| *17.0-36.0* | 23 | 23 | 24 | 24 | 24 | 25 | 24 | 22 | 22 | 20 | 25 | 22 | 26 |
| *36.0-55.0* | 22 | 20 | 21 | 19 | 22 | 19 | 21 | 19 | 16 | 20 | 21 | 20 | 23 |
| *55.0-74.1* | 19 | 16 | 16 | 15 | 15 | 15 | 13 | 16 | 13 | 15 | 15 | 16 | 14 |
| *74.1-93.1* | 9 | 10 | 8 | 9 | 7 | 8 | 7 | 9 | 8 | 9 | 7 | 9 | 7 |
| *93.1-112.1* | 3 | 3 | 2 | 4 | 2 | 3 | 2 | 3 | 4 | 5 | 2 | 2 | 2 |
| *112.1-131.1* | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 |
| *131.1-150.1* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| *150.1-169.1* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *169.1-188.1* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *188.1-207.2* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *107.2-226.2* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *>226.2* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Median* | 39 | 35 | 34 | 35 | 34 | 32 | 31 | 35 | 30 | 36 | 32 | 34 | 34 |

***Table 3*** *Mode of occurrence of PGE minerals in fourteen samples of UG2 chromitite milled to 80% <75 µm.*

| | **A2** | **B2** | **A1** | **B1** | **A3** | **B3** | **A4** | **B4** | **A5** | **C1** | **C2** | **C3** | **C4** | **C5** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *number of PGEMs* | 185 | 193 | 619 | 187 | 217 | 190 | 211 | 217 | 216 | 236 | 185 | 191 | 203 | 183 |
| | % Number of grains | | | | | | | | | | | | | |
| *Liberated PGEM* | 51 | 46 | 57 | 59 | 62 | 48 | 59 | 67 | 33 | 59 | 68 | 57 | 65 | 71 |
| *PGEM locked in BMS* | 15 | 16 | 14 | 11 | 8 | 14 | 11 | 9 | 4 | 8 | 1 | 3 | 5 | 3 |
| *PGEM locked in oxide* | 2 | 4 | 3 | 2 | 3 | 4 | 0 | 2 | 4 | 5 | 5 | 3 | 5 | 4 |
| *PGEM locked in silicate* | 3 | 4 | 1 | 2 | 5 | 6 | 4 | 4 | 20 | 12 | 4 | 18 | 10 | 5 |
| *Grain boundary BMS/Gangue* | 3 | 6 | 4 | 5 | 5 | 3 | 3 | 2 | 16 | 6 | 9 | 7 | 6 | 4 |
| *Grain edge of BMS* | 18 | 20 | 16 | 18 | 10 | 17 | 17 | 7 | 1 | 3 | 5 | 4 | 3 | 4 |
| *Grain edge of gangue* | 8 | 5 | 5 | 4 | 6 | 7 | 5 | 10 | 22 | 7 | 8 | 8 | 6 | 8 |
| | Volume % | | | | | | | | | | | | | |
| *Liberated PGEM* | 49 | 48 | 57 | 64 | 60 | 57 | 76 | 66 | 48 | 62 | 61 | 54 | 61 | 76 |
| *PGEM locked in BMS* | 15 | 14 | 13 | 6 | 6 | 10 | 5 | 11 | 1 | 4 | 0 | 2 | 3 | 1 |
| *PGEM locked in oxide* | 1 | 2 | 3 | 3 | 1 | 3 | 0 | 2 | 3 | 8 | 8 | 2 | 5 | 2 |
| *PGEM locked in silicate* | 4 | 1 | 1 | 1 | 15 | 5 | 2 | 1 | 22 | 9 | 1 | 17 | 6 | 3 |
| *Grain boundary BMS/Gangue* | 3 | 2 | 3 | 3 | 9 | 2 | 2 | 1 | 9 | 8 | 12 | 9 | 14 | 9 |
| *Grain edge of BMS* | 17 | 31 | 18 | 18 | 5 | 18 | 12 | 15 | 0 | 4 | 8 | 3 | 4 | 1 |
| *Grain edge of gangue* | 11 | 3 | 5 | 4 | 5 | 4 | 3 | 5 | 17 | 4 | 10 | 12 | 7 | 8 |

***Table 4*** *Chromite grain-size distribution in flotation products of sample C1 (reported in area per cent).*

| *Size class (µm)* | *RC1* | *RC2* | *RC3-5* | *RT* |
|---|---|---|---|---|
| *0.0-17.0* | 99.2 | 96.7 | 98.8 | 4.9 |
| *17.0-36.0* | 0.8 | 1.2 | 1.2 | 23.2 |
| *36.0-55.0* | 0.0 | 2.1 | 0.0 | 24 |
| *55.0-74.1* | 0 | 0 | 0 | 18.4 |
| *74.1-93.1* | 0 | 0 | 0 | 14.1 |
| *93.1-112.1* | 0 | 0 | 0 | 9.2 |
| *112.1-131.1* | 0 | 0 | 0 | 3.6 |
| *131.1-150.1* | 0 | 0 | 0 | 2.1 |
| *150.1-169.1* | 0 | 0 | 0 | 0.1 |
| *169.1-188.1* | 0 | 0 | 0 | 0 |
| *188.1-207.2* | 0 | 0 | 0 | 0 |
| *207.2-226.2* | 0 | 0 | 0 | 0 |
| *>225* | 0 | 0 | 0 | 0.4 |
| | 100 | 100 | 100 | 100 |

*RC1= rougher concentrate 1, RC2=rougher concentrate 2, RC3-5=combined rougher concentrate 3 to 5, RT=rougher tailings*

***Table 5*** *Silicate grain-size distributions in flotation products of sample C1 (reported in area per cent).*

| *Size class (µm)* | *RC1* | *RC2* | *RC3-5* | *RT* |
|---|---|---|---|---|
| *0.0-17.0* | 85 | 81.9 | 88 | 9 |
| *17.0-36.0* | 12.3 | 13.6 | 6.4 | 31.4 |
| *36.0-55.0* | 2.7 | 4.4 | 5.8 | 25.1 |
| *55.0-74.1* | 0 | 0 | 0 | 14.8 |
| *74.1-93.1* | 0 | 0 | 0 | 11.6 |
| *93.1-112.1* | 0 | 0 | 0 | 5.5 |
| *112.1-131.1* | 0 | 0 | 0 | 1.4 |
| *131.1-150.1* | 0 | 0 | 0 | 0.8 |
| *150.1-169.1* | 0 | 0 | 0 | 0.5 |
| *169.1-188.1* | 0 | 0 | 0 | 0 |
| *188.1-207.2* | 0 | 0 | 0 | 0 |
| *207.2-226.2* | 0 | 0 | 0 | 0 |
| *>225* | 0 | 0 | 0 | 0 |

*RC1= rougher concentrate 1, RC2=rougher concentrate 2, RC3-5=combined rougher concentrate 3 to 5, RT=rougher tailings*

***Table 6*** *Relative proportions of silicate minerals in flotation products of selected samples determined by image analysis. Reported in volume %.*

| A1 | RC1 | RC2 | RC3-5 | RT |
|---|---|---|---|---|
| *Ca-Al-silicate** | 63 | 62 | 58 | 57 |
| *Mg-Fe-silicate+* | 31 | 32 | 35 | 40 |
| *Phlogopite* | 2 | 2 | 2 | 1 |
| *Clinopyroxene* | 1 | 1 | 1 | 1 |
| *Quartz* | 0 | 0 | 0 | 0 |
| *Chlorite* | 0 | 1 | 1 | 1 |
| *Amphibole* | 2 | 2 | 2 | 0 |
| *Albite* | 0 | 0 | 0 | 0 |
| *K-Al-silicate°* | 0 | 0 | 0 | 0 |
| **A3** | **RC1** | **RC2** | **RC3-5** | **RT** |
| *Ca-Al-silicate** | 62 | 63 | 58 | 69 |
| *Mg-Fe-silicate+* | 33 | 31 | 36 | 28 |
| *Phlogopite* | 1 | 2 | 1 | 1 |
| *Clinopyroxene* | 1 | 1 | 1 | 0 |
| *Quartz* | 0 | 0 | 0 | 0 |
| *Chlorite* | 1 | 1 | 1 | 0 |
| *Amphibole* | 0 | 1 | 2 | 0 |
| *Albite* | 1 | 1 | 1 | 0 |
| *K-Al-silicate°* | 0 | 1 | 1 | 1 |
| **B3** | **RC1** | **RC2** | **RC3-5** | **RT** |
| *Ca-Al-silicate** | 50 | 43 | 43 | 65 |
| *Mg-Fe-silicate+* | 42 | 48 | 51 | 31 |
| *Phlogopite* | 1 | 1 | 0 | 2 |
| *Clinopyroxene* | 3 | 3 | 4 | 1 |
| *Quartz* | 0 | 0 | 0 | 0 |
| *Chlorite* | 1 | 1 | 1 | 0 |
| *Amphibole* | 5 | 3 | 2 | 1 |
| *Albite* | 0 | 0 | 0 | 0 |
| *K-Al-silicate°* | 0 | 0 | 0 | 0 |
| **A4** | **RC1** | **RC2** | **RC3-5** | **RT** |
| *Ca-Al-silicate** | 21 | 22 | 21 | 24 |
| *Mg-Fe-silicate+* | 48 | 50 | 47 | 39 |
| *Phlogopite* | 0 | 0 | 0 | 0 |
| *Clinopyroxene* | 19 | 19 | 20 | 29 |
| *Quartz* | 1 | 1 | 1 | 0 |
| *Chlorite* | 2 | 2 | 2 | 0 |
| *Amphibole* | 6 | 6 | 9 | 1 |
| *Albite* | 0 | 0 | 0 | 0 |
| *K-Al-silicate°* | 0 | 0 | 0 | 0 |

***Table 6 continued*** *Relative proportions of silicate minerals in flotation products of selected samples determined by image analysis. Reported in volume %.*

| B4 | RC1 | RC2 | RC3-5 | RT |
|---|---|---|---|---|
| *Ca-Al-silicate** | 33 | 38 | 41 | 68 |
| *Mg-Fe-silicate+* | 54 | 49 | 45 | 19 |
| *Phlogopite* | 0 | 0 | 1 | 1 |
| *Clinopyroxene* | 8 | 6 | 7 | 8 |
| *Quartz* | 0 | 0 | 0 | 0 |
| *Chlorite* | 1 | 3 | 2 | 1 |
| *Amphibole* | 3 | 4 | 4 | 1 |
| *Albite* | 0 | 0 | 0 | 0 |
| *K-Al-silicate°* | 0 | 0 | 0 | 0 |
| **A5** | **RC1** | **RC2** | **RC3-5** | **RT** |
| *Ca-Al-silicate** | 16 | 16 | 23 | 50 |
| *Mg-Fe-silicate+* | 68 | 53 | 44 | 16 |
| *Phlogopite* | 0 | 0 | 0 | 1 |
| *Clinopyroxene* | 8 | 8 | 11 | 7 |
| *Quartz* | 2 | 1 | 0 | 1 |
| *Chlorite* | 3 | 15 | 14 | 16 |
| *Amphibole* | 2 | 6 | 6 | 6 |
| *Albite* | 2 | 1 | 1 | 4 |
| *K-Al-silicate°* | 0 | 0 | 0 | 0 |
| **C1** | **RC1** | **RC2** | **RC3-5** | **RT** |
| *Ca-Al-silicate** | 8 | 10 | 18 | 66 |
| *Mg-Fe-silicate+* | 70 | 64 | 51 | 12 |
| *Phlogopite* | 0 | 0 | 0 | 0 |
| *Clinopyroxene* | 4 | 5 | 5 | 4 |
| *Quartz* | 2 | 2 | 2 | 4 |
| *Chlorite* | 12 | 14 | 17 | 6 |
| *Amphibole* | 3 | 3 | 3 | 2 |
| *Albite* | 1 | 1 | 2 | 4 |
| *K-Al-silicate°* | 0 | 0 | 1 | 1 |
| **C4** | **RC1** | **RC2** | **RC3-5** | **RT** |
| *Ca-Al-silicate** | 27 | 25 | 28 | 77 |
| *Mg-Fe-silicate+* | 63 | 66 | 64 | 18 |
| *Phlogopite* | 0 | 0 | 1 | 1 |
| *Clinopyroxene* | 1 | 1 | 1 | 0 |
| *Quartz* | 1 | 0 | 1 | 1 |
| *Chlorite* | 5 | 5 | 4 | 1 |
| *Amphibole* | 3 | 3 | 3 | 0 |
| *Albite* | 1 | 0 | 1 | 1 |
| *K-Al-silicate°* | 0 | 0 | 0 | 0 |

*RC1= rougher concentrate 1, RC2=rougher concentrate 2, RC3-5=combined rougher concentrate 3 to 5, RT=rougher tailings*

* *Predominantly plagioclase. Also includes pumpellyite, prehnite and epidote, especially in samples from area C.*

+ *Predominantly orthopyroxene, minor talc, and rarely serpentine and olivine*

° *K-feldspar and sericite*

***Table 7*** *Liberation characteristics of base-metal sulphide grains in flotation products of selected samples (reported in area %).*

| ***RC1*** | *A1* | *A3* | *A4* | *B4* | *A5* | *C1* | *C2* |
|---|---|---|---|---|---|---|---|
| *0.0-0.2* | 0 | 4 | 1 | 1 | 9 | 5 | 3 |
| *0.2-0.4* | 1 | 4 | 0 | 0 | 16 | 5 | 2 |
| *0.4-0.6* | 0 | 1 | 0 | 0 | 3 | 5 | 6 |
| *0.6-0.8* | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *0.8-1.0* | 98 | 91 | 99 | 99 | 72 | 84 | 89 |
| ***RC2*** | *A1* | *A3* | *A4* | *B4* | *A5* | *C1* | *C2* |
| *0.0-0.2* | 2 | 4 | 0 | 1 | 12 | 14 | 5 |
| *0.2-0.4* | 2 | 0 | 0 | 1 | 7 | 0 | 5 |
| *0.4-0.6* | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| *0.6-0.8* | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *0.8-1.0* | 96 | 94 | 99 | 98 | 80 | 86 | 89 |
| ***RC3-5*** | *A1* | *A3* | *A4* | *B4* | *A5* | *C1* | *C2* |
| *0.0-0.2* | 8 | 13 | 4 | 3 | 28 | 24 | 19 |
| *0.2-0.4* | 0 | 16 | 2 | 2 | 3 | 0 | 1 |
| *0.4-0.6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *0.6-0.8* | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *0.8-1.0* | 92 | 71 | 94 | 94 | 69 | 76 | 80 |

*RC1= rougher concentrate 1, RC2=rougher concentrate 2, RC3-5=combined rougher concentrates 3 to 5*

***Table 8*** *Chalcopyrite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***A2*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.38 | 0.38 | 67.87 | 67.87 |
| *RC-2* | 0.08 | 0.22 | 16.85 | 84.71 |
| *RC-3-5* | 0.05 | 0.14 | 15.29 | 100.00 |
| ***B2*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.32 | 0.32 | 69.54 | 69.54 |
| *RC-2* | 0.05 | 0.16 | 13.69 | 83.23 |
| *RC-3-5* | 0.03 | 0.10 | 16.77 | 100.00 |
| ***A1*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.35 | 0.35 | 72.47 | 72.47 |
| *RC-2* | 0.10 | 0.25 | 13.66 | 86.13 |
| *RC-3-5* | 0.05 | 0.17 | 13.87 | 100.00 |
| ***B1*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.65 | 0.65 | 82.57 | 82.57 |
| *RC-2* | 0.09 | 0.43 | 7.52 | 90.09 |
| *RC-3-5* | 0.06 | 0.26 | 9.91 | 100.00 |
| ***A3*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.6463 | 0.65 | 65.56 | 65.56 |
| *RC-2* | 0.1699 | 0.41 | 16.69 | 82.25 |
| *RC-3-5* | 0.10 | 0.26 | 17.75 | 100.00 |
| ***B3*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.82 | 0.82 | 72.34 | 72.34 |
| *RC-2* | 0.16 | 0.47 | 15.04 | 87.38 |
| *RC-3-5* | 0.06 | 0.25 | 12.62 | 100.00 |
| ***A4*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.78 | 0.78 | 59.43 | 59.43 |
| *RC-2* | 0.24 | 0.50 | 20.74 | 80.17 |
| *RC-3-5* | 0.11 | 0.29 | 19.83 | 100.00 |
| ***B4*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 1.34 | 1.34 | 69.30 | 69.30 |
| *RC-2* | 0.24 | 0.75 | 14.98 | 84.28 |
| *RC-3-5* | 0.09 | 0.35 | 15.72 | 100.00 |
| ***A5*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.26 | 0.26 | 63.65 | 63.65 |
| *RC-2* | 0.06 | 0.16 | 16.04 | 79.69 |
| *RC-3-5* | 0.04 | 0.10 | 20.31 | 100.00 |
| ***C1*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.28 | 0.28 | 54.79 | 54.79 |
| *RC-2* | 0.08 | 0.17 | 18.89 | 73.68 |
| *RC-3-5* | 0.05 | 0.10 | 26.32 | 100.00 |

***Table 8 continued*** *Chalcopyrite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***C2*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.22 | 0.22 | 53.39 | 53.39 |
| *RC-2* | 0.07 | 0.14 | 18.67 | 72.06 |
| *RC-3-5* | 0.04 | 0.08 | 27.94 | 100.00 |
| ***C3*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.20 | 0.20 | 50.59 | 50.59 |
| *RC-2* | 0.07 | 0.13 | 19.94 | 70.53 |
| *RC-3-5* | 0.04 | 0.08 | 29.47 | 100.00 |
| ***C4*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.12 | 0.12 | 48.37 | 48.37 |
| *RC-2* | 0.04 | 0.08 | 22.00 | 70.37 |
| *RC-3-5* | 0.03 | 0.05 | 29.63 | 100.00 |
| ***C5*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.26 | 0.26 | 53.67 | 53.67 |
| *RC-2* | 0.07 | 0.15 | 19.15 | 72.82 |
| *RC-3-5* | 0.04 | 0.09 | 27.18 | 100.00 |
| ***Comp.*** | *cpy content g/t* | *cpy content g/t cum.* | *cpy distribution. %* | *cpy distribution % cum.* |
| *RC-1* | 0.47 | 0.47 | 67.56 | 67.56 |
| *RC-2* | 0.11 | 0.29 | 15.52 | 83.08 |
| *RC-3-5* | 0.06 | 0.17 | 16.92 | 100.00 |

***Table 9*** *Pentlandite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***A2*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 1.11 | 1.11 | 63.60 | 63.60 |
| *RC-2* | 0.45 | 0.76 | 29.19 | 92.79 |
| *RC-3-5* | 0.07 | 0.44 | 7.21 | 100.00 |
| ***B2*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.63 | 0.63 | 51.33 | 51.33 |
| *RC-2* | 0.28 | 0.43 | 32.56 | 83.89 |
| *RC-3-5* | 0.08 | 0.26 | 16.11 | 100.00 |
| ***A1*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 1.17 | 1.17 | 66.02 | 66.02 |
| *RC-2* | 0.54 | 0.93 | 19.43 | 85.44 |
| *RC-3-5* | 0.20 | 0.61 | 14.56 | 100.00 |

***Table 9 continued*** *Pentlandite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***B1*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 1.23 | 1.23 | 58.72 | 58.72 |
| *RC-2* | 0.97 | 1.13 | 29.83 | 88.55 |
| *RC-3-5* | 0.18 | 0.70 | 11.45 | 100.00 |
| ***A3*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 1.32 | 1.32 | 52.23 | 52.23 |
| *RC-2* | 0.83 | 1.08 | 31.72 | 83.95 |
| *RC-3-5* | 0.22 | 0.67 | 16.05 | 100.00 |
| ***B3*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 2.12 | 2.12 | 67.11 | 67.11 |
| *RC-2* | 0.74 | 1.40 | 25.64 | 92.75 |
| *RC-3-5* | 0.10 | 0.71 | 7.25 | 100.00 |
| ***A4*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 1.79 | 1.79 | 40.50 | 40.50 |
| *RC-2* | 1.52 | 1.65 | 38.85 | 79.35 |
| *RC-3-5* | 0.38 | 0.98 | 20.65 | 100.00 |
| ***B4*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.63 | 0.63 | 53.88 | 53.88 |
| *RC-2* | 0.31 | 0.46 | 31.33 | 85.21 |
| *RC-3-5* | 0.05 | 0.21 | 14.79 | 100.00 |
| ***A5*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.42 | 0.42 | 32.70 | 32.70 |
| *RC-2* | 0.45 | 0.44 | 35.85 | 68.55 |
| *RC-3-5* | 0.18 | 0.30 | 31.45 | 100.00 |
| ***C1*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.04 | 0.04 | 57.92 | 57.92 |
| *RC-2* | 0.02 | 0.03 | 30.80 | 88.72 |
| *RC-3-5* | 0.00 | 0.01 | 11.28 | 100.00 |
| ***C2*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.07 | 0.07 | 53.88 | 53.88 |
| *RC-2* | 0.03 | 0.05 | 25.85 | 79.72 |
| *RC-3-5* | 0.01 | 0.03 | 20.28 | 100.00 |
| ***C3*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.09 | 0.09 | 48.53 | 48.53 |
| *RC-2* | 0.06 | 0.07 | 39.04 | 87.57 |
| *RC-3-5* | 0.01 | 0.04 | 12.43 | 100.00 |

***Table 9 continued*** *Pentlandite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***C4*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.07 | 0.07 | 67.38 | 67.38 |
| *RC-2* | 0.02 | 0.04 | 29.76 | 97.14 |
| *RC-3-5* | 0.00 | 0.02 | 2.86 | 100.00 |
| ***C5*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.07 | 0.07 | 43.14 | 43.14 |
| *RC-2* | 0.06 | 0.07 | 45.59 | 88.73 |
| *RC-3-5* | 0.01 | 0.03 | 11.27 | 100.00 |
| ***Comp.*** | *pn content g/t* | *pn content g/t cum.* | *pn distribution. %* | *pn distribution % cum.* |
| *RC-1* | 0.77 | 0.77 | 53.31 | 53.31 |
| *RC-2* | 0.45 | 0.61 | 31.01 | 84.33 |
| *RC-3-5* | 0.11 | 0.35 | 15.67 | 100.00 |

***Table 10*** *Pyrrhotite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***A2*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.24 | 0.24 | 41.80 | 41.80 |
| *RC-2* | 0.23 | 0.23 | 45.77 | 87.57 |
| *RC-3-5* | 0.04 | 0.14 | 12.43 | 100.00 |
| ***B2*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.07 | 0.07 | 31.03 | 31.03 |
| *RC-2* | 0.10 | 0.09 | 60.71 | 91.74 |
| *RC-3-5* | 0.01 | 0.05 | 8.26 | 100.00 |
| ***A1*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.48 | 0.48 | 28.97 | 28.97 |
| *RC-2* | 0.84 | 0.62 | 32.38 | 61.36 |
| *RC-3-5* | 0.50 | 0.57 | 38.64 | 100.00 |
| ***B1*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.67 | 0.67 | 24.36 | 24.36 |
| *RC-2* | 1.71 | 1.08 | 40.20 | 64.56 |
| *RC-3-5* | 0.72 | 0.92 | 35.44 | 100.00 |
| ***A3*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.36 | 0.36 | 14.27 | 14.27 |
| *RC-2* | 1.26 | 0.80 | 48.67 | 62.93 |
| *RC-3-5* | 0.51 | 0.66 | 37.07 | 100.00 |
| ***B3*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.69 | 0.69 | 21.54 | 21.54 |
| *RC-2* | 1.49 | 1.11 | 51.05 | 72.58 |
| *RC-3-5* | 0.37 | 0.71 | 27.42 | 100.00 |

***Table 10 continued*** *Pyrrhotite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***A4*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.36 | 0.36 | 17.39 | 17.39 |
| *RC-2* | 0.66 | 0.52 | 35.37 | 52.76 |
| *RC-3-5* | 0.41 | 0.46 | 47.24 | 100.00 |
| ***B4*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.50 | 0.50 | 47.12 | 47.12 |
| *RC-2* | 0.30 | 0.39 | 33.10 | 80.22 |
| *RC-3-5* | 0.06 | 0.19 | 19.78 | 100.00 |
| ***A5*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.02 | 0.02 | 23.16 | 23.16 |
| *RC-2* | 0.03 | 0.02 | 45.02 | 68.18 |
| *RC-3-5* | 0.01 | 0.02 | 31.82 | 100.00 |
| ***C1*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.01 | 0.01 | 17.41 | 17.41 |
| *RC-2* | 0.01 | 0.01 | 18.87 | 36.28 |
| *RC-3-5* | 0.02 | 0.02 | 63.72 | 100.00 |
| ***C2*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.02 | 0.02 | 29.91 | 29.91 |
| *RC-2* | 0.02 | 0.02 | 36.55 | 66.46 |
| *RC-3-5* | 0.01 | 0.01 | 33.54 | 100.00 |
| ***C3*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.01 | 0.01 | 11.95 | 11.95 |
| *RC-2* | 0.02 | 0.02 | 53.86 | 65.81 |
| *RC-3-5* | 0.01 | 0.01 | 34.19 | 100.00 |
| ***C5*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.01 | 0.01 | 33.52 | 33.52 |
| *RC-2* | 0.01 | 0.01 | 66.48 | 100.00 |
| *RC-3-5* | 0.00 | 0.00 | 0.00 | 100.00 |
| ***Comp.*** | *po content g/t* | *po content g/t cum.* | *po distribution. %* | *po distribution % cum.* |
| *RC-1* | 0.26 | 0.26 | 21.80 | 21.80 |
| *RC-2* | 0.51 | 0.39 | 42.33 | 64.14 |
| *RC-3-5* | 0.20 | 0.29 | 35.86 | 100.00 |

***Table 11*** *Pyrite recovery to three flotation concentrates, assuming a 100% total recovery.*

| ***A2*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.21 | 0.21 | 79.14 | 79.14 |
| *RC-2* | 0.04 | 0.12 | 16.87 | 96.01 |
| *RC-3-5* | 0.01 | 0.07 | 3.99 | 100.00 |

***Table 11 continued*** *Pyrite recovery to three flotation concentrates, assuming a 100% total recovery.*

| **B2** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.51 | 0.51 | 66.72 | 66.72 |
| *RC-2* | 0.18 | 0.32 | 33.28 | 100.00 |
| *RC-3-5* | 0.00 | 0.16 | 0.00 | 100.00 |
| ***A1*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.22 | 0.22 | 72.87 | 72.87 |
| *RC-2* | 0.05 | 0.15 | 10.38 | 83.25 |
| *RC-3-5* | 0.04 | 0.10 | 16.75 | 100.00 |
| ***B1*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.00 | 0.00 | 7.71 | 7.71 |
| *RC-2* | 0.00 | 0.00 | 9.20 | 16.91 |
| *RC-3-5* | 0.01 | 0.01 | 83.09 | 100.00 |
| ***A3*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.54 | 0.54 | 78.71 | 78.71 |
| *RC-2* | 0.10 | 0.32 | 14.92 | 93.63 |
| *RC-3-5* | 0.02 | 0.18 | 6.37 | 100.00 |
| ***B3*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.05 | 0.05 | 51.28 | 51.28 |
| *RC-2* | 0.03 | 0.04 | 31.84 | 83.12 |
| *RC-3-5* | 0.01 | 0.02 | 16.88 | 100.00 |
| ***A4*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.06 | 0.06 | 40.74 | 40.74 |
| *RC-2* | 0.02 | 0.04 | 13.56 | 54.30 |
| *RC-3-5* | 0.03 | 0.03 | 45.70 | 100.00 |
| ***B4*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.04 | 0.04 | 89.52 | 89.52 |
| *RC-2* | 0.00 | 0.02 | 8.18 | 97.70 |
| *RC-3-5* | 0.00 | 0.01 | 2.30 | 100.00 |
| ***A5*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.01 | 0.01 | 26.88 | 26.88 |
| *RC-2* | 0.02 | 0.01 | 71.34 | 98.22 |
| *RC-3-5* | 0.00 | 0.01 | 1.78 | 100.00 |
| ***C1*** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.23 | 0.23 | 58.45 | 58.45 |
| *RC-2* | 0.06 | 0.14 | 17.78 | 76.23 |
| *RC-3-5* | 0.03 | 0.08 | 23.77 | 100.00 |

***Table 11 continued*** *Pyrite recovery to three flotation concentrates, assuming a 100% total recovery*

| **C2** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 1.04 | 1.04 | 74.84 | 74.84 |
| *RC-2* | 0.24 | 0.61 | 20.50 | 95.34 |
| *RC-3-5* | 0.02 | 0.28 | 4.66 | 100.00 |
| **C3** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.22 | 0.22 | 65.81 | 65.81 |
| *RC-2* | 0.09 | 0.15 | 32.29 | 98.10 |
| *RC-3-5* | 0.00 | 0.07 | 1.90 | 100.00 |
| **C4** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.67 | 0.67 | 76.95 | 76.95 |
| *RC-2* | 0.13 | 0.36 | 19.70 | 96.64 |
| *RC-3-5* | 0.01 | 0.18 | 3.36 | 100.00 |
| **C5** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.38 | 0.38 | 74.18 | 74.18 |
| *RC-2* | 0.09 | 0.21 | 21.80 | 95.97 |
| *RC-3-5* | 0.01 | 0.09 | 4.03 | 100.00 |
| **Comp** | *py content g/t* | *py content g/t cum.* | *py distribution. %* | *py distribution % cum.* |
| *RC-1* | 0.30 | 0.30 | 74.18 | 74.18 |
| *RC-2* | 0.08 | 0.19 | 18.68 | 92.86 |
| *RC-3-5* | 0.01 | 0.10 | 7.14 | 100.00 |

***Table 12*** *Millerite recovery to three flotation concentrates, assuming a 100% total recovery*

| **B2** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.05 | 0.05 | 48.59 | 48.59 |
| *RC-2* | 0.04 | 0.04 | 51.41 | 100.00 |
| *RC-3-5* | 0.00 | 0.02 | 0.00 | 100.00 |
| **C1** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
| *RC-1* | 0.32 | 0.32 | 58.02 | 58.02 |
| *RC-2* | 0.12 | 0.21 | 25.84 | 83.86 |
| *RC-3-5* | 0.03 | 0.11 | 16.14 | 100.00 |
| **C2** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
| *RC-1* | 0.48 | 0.48 | 60.21 | 60.21 |
| *RC-2* | 0.20 | 0.33 | 28.76 | 88.97 |
| *RC-3-5* | 0.03 | 0.16 | 11.03 | 100.00 |
| **C3** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
| *RC-1* | 0.17 | 0.17 | 40.03 | 40.03 |
| *RC-2* | 0.08 | 0.12 | 20.72 | 60.75 |
| *RC-3-5* | 0.06 | 0.09 | 39.25 | 100.00 |

***Table 12 continued*** *Millerite recovery to three flotation concentrates, assuming a 100% total recovery*

| ***C4*** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
|---|---|---|---|---|
| *RC-1* | 0.24 | 0.24 | 66.92 | 66.92 |
| *RC-2* | 0.07 | 0.14 | 25.16 | 92.08 |
| *RC-3-5* | 0.01 | 0.07 | 7.92 | 100.00 |
| ***C5*** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
| *RC-1* | 0.41 | 0.41 | 60.53 | 60.53 |
| *RC-2* | 0.17 | 0.28 | 31.63 | 92.16 |
| *RC-3-5* | 0.02 | 0.12 | 7.84 | 100.00 |
| ***Comp.*** | *mil content g/t* | *mil content g/t cum.* | *mil distribution. %* | *mil distribution % cum.* |
| *RC-1* | 0.28 | 0.28 | 62.83 | 62.83 |
| *RC-2* | 0.11 | 0.20 | 25.01 | 87.84 |
| *RC-3-5* | 0.03 | 0.11 | 12.16 | 100.00 |

***Table 13*** *Relative proportions of* ***liberated*** *grains of different PGE minerals in flotation concentrates of samples A1, A3, A4, B4, A5, C1 and C2.*

| **A1** | *RC1 (235)* | | *RC2 (271)* | | *RC3-5 (143)* | |
|---|---|---|---|---|---|---|
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 40 | 37 | 27 | 30 | 22 | 20 |
| *Pt,S* | 27 | 18 | 29 | 17 | 32 | 23 |
| *Pt,Rh,Cu,Ni,S* | 15 | 28 | 16 | 19 | 7 | 9 |
| *Ru,Os, Ir,S* | 9 | 7 | 13 | 22 | 13 | 21 |
| *PGE,Bi,Te* | 1 | 0 | 4 | 3 | 3 | 2 |
| *PGE,As,S* | 0 | 0 | 3 | 2 | 2 | 1 |
| *Pt,Pd,Rh,Fe* | 4 | 3 | 6 | 5 | 14 | 19 |
| *Pd,Pb,Sb,Hg* | 3 | 6 | 2 | 3 | 7 | 3 |
| **A3** | *RC1 (175)* | | *RC2 (113)* | | *RC3-5 (165)* | |
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 17 | 18 | 12 | 16 | 9 | 9 |
| *Pt,S* | 33 | 14 | 44 | 38 | 36 | 24 |
| *Pt,Rh,Cu,Ni,S* | 29 | 39 | 23 | 22 | 23 | 24 |
| *Ru,Os, Ir,S* | 10 | 15 | 7 | 16 | 12 | 18 |
| *PGE,Bi,Te* | 3 | 12 | 3 | 2 | 4 | 4 |
| *PGE,As,S* | 3 | 1 | 2 | 1 | 8 | 8 |
| *Pt,Pd,Rh,Fe* | 1 | 0 | 4 | 1 | 2 | 3 |
| *Pd,Pb,Sb,Hg* | 3 | 1 | 4 | 3 | 7 | 10 |
| **A4** | *RC1 (118)* | | *RC2 (70)* | | *RC3-5 (102)* | |
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 3 | 1 | 7 | 5 | 3 | 5 |
| *Pt,S* | 14 | 6 | 11 | 8 | 9 | 8 |
| *Pt,Rh,Cu,Ni,S* | 0 | 0 | 6 | 4 | 3 | 1 |
| *Ru,Os, Ir,S* | 16 | 42 | 17 | 29 | 17 | 30 |
| *PGE,Bi,Te* | 7 | 6 | 4 | 1 | 13 | 11 |
| *PGE,As,S* | 2 | 1 | 0 | 0 | 0 | 0 |
| *Pt,Pd,Rh,Fe* | 46 | 36 | 49 | 49 | 43 | 35 |
| *Pd,Pb,Sb,Hg* | 13 | 8 | 6 | 3 | 12 | 9 |
| **B4** | *RC1 (167)* | | *RC2 (161)* | | *RC3-5 (185)* | |
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 4 | 3 | 10 | 6 | 8 | 4 |
| *Pt,S* | 4 | 3 | 6 | 6 | 8 | 4 |
| *Pt,Rh,Cu,Ni,S* | 2 | 1 | 3 | 2 | 2 | 1 |
| *Ru,Os, Ir,S* | 25 | 36 | 25 | 40 | 22 | 41 |
| *PGE,Bi,Te* | 7 | 3 | 6 | 3 | 8 | 5 |
| *PGE,As,S* | 2 | 0 | 0 | 0 | 2 | 2 |
| *Pt,Pd,Rh,Fe* | 51 | 50 | 47 | 41 | 45 | 40 |
| *Pd,Pb,Sb,Hg* | 4 | 3 | 4 | 2 | 4 | 3 |
| **A5** | *RC1 (121)* | | *RC2 (114)* | | *RC3-5 (38)* | |
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 8 | 5 | 4 | 3 | 8 | 17 |
| *Pt,S* | 6 | 3 | 5 | 4 | 3 | 14 |
| *Pt,Rh,Cu,Ni,S* | 9 | 5 | 9 | 8 | 5 | 5 |
| *Ru,Os, Ir,S* | 20 | 39 | 16 | 34 | 24 | 29 |
| *PGE,Bi,Te* | 1 | 0 | 1 | 0 | 3 | 2 |
| *PGE,As,S* | 10 | 3 | 17 | 15 | 13 | 4 |
| *Pt,Pd,Rh,Fe* | 11 | 7 | 13 | 10 | 21 | 13 |
| *Pd,Pb,Sb,Hg* | 36 | 38 | 35 | 25 | 24 | 17 |

***Table 13 continued*** *Relative proportions of* ***liberated*** *grains of different PGE minerals in flotation concentrates of samples A1, A3, A4, B4, A5, C1 and C2.*

| **C1** | *RC1 (235)* | | *RC2 (118)* | | *RC3-5 (134)* | |
|---|---|---|---|---|---|---|
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 47 | 63 | 38 | 37 | 33 | 26 |
| *Pt,S* | 5 | 6 | 9 | 4 | 7 | 4 |
| *Pt,Rh,Cu,Ni,S* | 28 | 17 | 36 | 38 | 31 | 35 |
| *Ru,Os, Ir,S* | 14 | 13 | 6 | 14 | 17 | 28 |
| *PGE,Bi,Te* | 1 | 0 | 3 | 1 | 2 | 1 |
| *PGE,As,S* | 1 | 0 | 5 | 3 | 6 | 3 |
| *Pt,Pd,Rh,Fe* | 0 | 0 | 1 | 1 | 0 | 0 |
| *Pd,Pb,Sb,Hg* | 3 | 1 | 3 | 1 | 4 | 3 |
| **C2** | *RC1 (229)* | | *RC2 (230)* | | *RC3-5 (169)* | |
| | *% no.* | *area %* | *% no.* | *area %* | *% no.* | *area %* |
| *Pt,Pd,S* | 41 | 48 | 36 | 31 | 30 | 23 |
| *Pt,S* | 7 | 5 | 5 | 1 | 5 | 5 |
| *Pt,Rh,Cu,Ni,S* | 39 | 38 | 44 | 45 | 35 | 26 |
| *Ru,Os, Ir,S* | 7 | 7 | 11 | 20 | 18 | 36 |
| *PGE,Bi,Te* | 1 | 1 | 1 | 0 | 0 | 0 |
| *PGE,As,S* | 2 | 0 | 4 | 2 | 10 | 9 |
| *Pt,Pd,Rh,Fe* | 0 | 0 | 0 | 0 | 0 | 0 |
| *Pd,Pb,Sb,Hg* | 4 | 1 | 0 | 0 | 3 | 0 |

# APPENDIX I

*Milling data*

***Table 1*** *Milling data for fourteen samples of UG2 chromitite.*

***Table 2*** *Screen analysis of fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 1*** *Milling data, % Cr2O3 and median measured chromite equivalent circle diameter (ECD) of chromite for fourteen samples of UG2 chromitite.*

| ***Sample*** | ***A1*** | | ***A2*** | | ***A3*** | | ***B1*** | | ***B2*** | | ***C1*** | | ***C2*** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* |
| Milling data | 0 | 12.4 | 0 | 23.15 | 0 | 10.25 | 0 | 11.03 | 0 | 13.76 | 0 | 6.77 | 0 | 5.18 |
| | 36 | 36.41 | 30 | 42.61 | 30 | 34.92 | 35 | 47.35 | 30 | 55.94 | 30 | 35.41 | 30 | 50.65 |
| | 75 | 58.37 | 60 | 61.52 | 90 | 71.22 | 70 | 77.06 | 65 | 74.45 | 45 | 47.68 | 60 | 68.45 |
| | 120 | 81.14 | 95 | 80.35 | 105 | 79.55 | 75 | 82.34 | 72 | 79.5 | 61 | 81.7 | 72 | 80.29 |
| | 135 | 87.3 | | | | | | | | | | | | |

| ***Sample*** | ***C3*** | | ***C4*** | | ***C5*** | | ***A4*** | | ***A5*** | | ***B3*** | | ***B4*** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* | *Time* | *% <75* |
| Milling data | 0 | 11.51 | 0 | 9.9 | 0 | 10.27 | 0 | 4.84 | 0 | 15.19 | 0 | 7.81 | 0 | 5.14 |
| | 30 | 65.59 | 30 | 35.11 | 30 | 44.96 | 60 | 65.48 | 30 | 71.91 | 40 | 50.05 | 60 | 70.77 |
| | 60 | 71.7 | 60 | 58.69 | 60 | 66.26 | 72 | 74.11 | 40 | 81 | 72 | 69.37 | 72 | 80.14 |
| | 70 | 80.61 | 95 | 79.25 | 75 | 80.76 | 80 | 80.02 | | | 82 | 75.22 | | |
| | | | | | | | | | | | 90 | 80.29 | | |

***Table 2*** *Screen analysis of fourteen samples of UG2 chromitite milled to 80% <75μm.*

| mass % | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Screen fraction** | **A2** | **B2** | **A1** | **B1** | **B3** | **A3** | **B4** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **C5** |
| *-38μm* | 41.59 | 46.87 | 47.91 | 44.66 | 49.22 | 42.21 | 46.06 | 48.65 | 48.62 | 44.01 | 46.41 | 46.48 | 49.50 | 45.97 |
| *+38μm* | 12.09 | 11.88 | 12.05 | 11.38 | 11.62 | 18.48 | 11.17 | 11.57 | 9.65 | 11.02 | 11.47 | 11.17 | 13.10 | 10.94 |
| *+53μm* | 23.58 | 21.45 | 21.98 | 20.27 | 19.11 | 18.32 | 21.63 | 17.23 | 16.61 | 19.13 | 20.83 | 19.86 | 20.77 | 20.18 |
| *+75μm* | 21.08 | 18.03 | 16.92 | 19.95 | 17.16 | 19.23 | 18.26 | 19.23 | 17.71 | 19.70 | 18.30 | 18.77 | 14.11 | 19.80 |
| *+106μm* | 1.65 | 1.77 | 1.13 | 3.60 | 2.78 | 1.33 | 2.84 | 3.31 | 6.04 | 5.46 | 2.72 | 3.71 | 2.22 | 3.09 |
| *+150μm* | 0.00 | 0.00 | 0.02 | 0.14 | 0.11 | 0.17 | 0.05 | 0.01 | 1.29 | 0.68 | 0.12 | 0.02 | 0.20 | 0.03 |
| *+212μm* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.09 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 |
| *+300μm* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.10 | 0.00 |
| **cumulative mass %** | | | | | | | | | | | | | | |
| **Screen fraction** | **A2** | **B2** | **A1** | **B1** | **B3** | **A3** | **B4** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **C5** |
| *-38μm* | 41.59 | 46.87 | 47.91 | 44.66 | 49.22 | 42.21 | 46.06 | 48.65 | 48.62 | 44.01 | 46.41 | 46.48 | 49.50 | 45.97 |
| *+38μm* | 53.68 | 58.75 | 59.96 | 56.04 | 60.84 | 60.70 | 57.22 | 60.22 | 58.27 | 55.03 | 57.89 | 57.65 | 62.60 | 56.91 |
| *+53μm* | 77.27 | 80.20 | 81.93 | 76.31 | 79.95 | 79.02 | 78.85 | 77.45 | 74.88 | 74.16 | 78.72 | 77.51 | 83.37 | 77.09 |
| *+75μm* | 98.35 | 98.23 | 98.86 | 96.26 | 97.10 | 98.25 | 97.11 | 96.68 | 92.59 | 93.86 | 97.01 | 96.27 | 97.48 | 96.88 |
| *+106μm* | 100.00 | 100.00 | 99.98 | 99.86 | 99.89 | 99.58 | 99.95 | 99.99 | 98.62 | 99.32 | 99.73 | 99.98 | 99.70 | 99.97 |
| *+150μm* | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.75 | 100.00 | 100.00 | 99.91 | 100.00 | 99.85 | 100.00 | 99.90 | 100.00 |
| *+212μm* | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.83 | 100.00 | 100.00 | 100.00 | 100.00 | 99.93 | 100.00 | 99.90 | 100.00 |
| *+300μm* | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

# APPENDIX J

*Flotation data*

*The following notation was used in all of the tables:*

RC1=Rougher concentrate 1 (1 minute flotation)

RC2=Rougher concentrate 2 (3 minutes flotation)

RC3=Rougher concentrate 3 (8 minutes flotation)

RC4=Rougher concentrate 4 (15 minutes flotation)

RC5=Rougher concentrate 5 (20 minutes flotation)

RC3-5=combined rougher concentrates 3, 4 and 5 (8 to 20 minutes flotation)

RT=Rougher tailings

***Table 1*** *Mass recoveries for fourteen UG2 chromitite samples milled to 80% <75μm.*

***Table 2*** *$Cr_2O_3$ recoveries from fourteen UG2 chromitite samples milled to 80%<75μm.*

***Table 3*** *Silicate gangue recoveries from fourteen UG2 chromitite samples milled to 80%<75μm.*

***Table 4*** *Cu recoveries from fourteen test samples milled to 80%<75μm.*

***Table 5*** *Kelsall flotation constants for Cu recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 6*** *Acid soluble Ni recoveries from fourteen test samples milled to 80%<75μm.*

***Table 7*** *Kelsall flotation constants for acid soluble Ni recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 8*** *PGE+Au recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 9*** *Kelsall flotation constants for PGE+Au recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 10*** *Platinum recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 11*** *Kelsall flotation constants for platinum recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

***Table 1*** *Mass recoveries for fourteen UG2 chromitite samples milled to 80% <75μm. Confidence limits for cumulative recoveries were calculated at the 95% confidence level.*

| **A2** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
|---|---|---|---|---|---|---|
| **Dry (g)** | 158.5 | 180.1 | 171.1 | 84.9 | 29.6 | 5367.6 |
| **Cum. Dry (g)** | 158.5 | 338.6 | 509.7 | 594.6 | 624.2 | 5991.8 |
| **Dry (%)** | 2.6 | 3.0 | 2.9 | 1.4 | 0.5 | 89.6 |
| **Cum. Dry (%)** | 2.6± 0.3 | 5.7± 0.4 | 8.5± 0.5 | 9.9± 0.5 | 10.4± 0.5 | 100.0 |
| **B2** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| **Dry (g)** | 160.1 | 225.9 | 229.1 | 106.7 | 38.4 | 5241.3 |
| **Cum. Dry (g)** | 160.1 | 386.0 | 615.1 | 721.8 | 760.2 | 6001.5 |
| **Dry (%)** | 2.7 | 3.8 | 3.8 | 1.8 | 0.6 | 87.3 |
| **Cum. Dry (%)** | 2.7± 0.3 | 6.4± 0.6 | 10.2± 0.7 | 12.0± 0.7 | 12.7± 0.8 | 100.0 |
| **A1** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| **Dry (g)** | 673.4 | 431.8 | 487.2 | 281.1 | 103.5 | 16004.9 |
| **Cum. Dry (g)** | 673.4 | 1105.2 | 1592.4 | 1873.5 | 1977.0 | 17981.9 |
| **Dry (%)** | 3.7 | 2.4 | 2.7 | 1.6 | 0.6 | 89.0 |
| **Cum. Dry (%)** | 3.7±0.3 | 6.1± 0.4 | 8.9± 0.5 | 10.4± 0.5 | 11.0± 0.5 | 100.0 |
| **B1** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| **Dry (g)** | 218.0 | 141.2 | 163.1 | 97.3 | 32.5 | 5339.6 |
| **Cum. Dry (g)** | 218.0 | 359.2 | 522.3 | 619.6 | 652.1 | 5991.7 |
| **Dry (%)** | 3.6 | 2.4 | 2.7 | 1.6 | 0.5 | 89.1 |
| **Cum. Dry (%)** | 3.6± 0.4 | 6.0± 0.6 | 8.7± 0.7 | 10.3± 0.8 | 10.9± 0.8 | 100.0 |
| **A3** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| **Dry (g)** | 179.7 | 174.0 | 192.1 | 100.8 | 37.0 | 5309.6 |
| **Cum. Dry (g)** | 179.7 | 353.7 | 545.8 | 646.6 | 683.6 | 5993.2 |
| **Dry (%)** | 3.0 | 2.9 | 3.2 | 1.7 | 0.6 | 88.6 |
| **Cum. Dry (%)** | 3.0± 0.6 | 5.9± 0.8 | 9.1± 0.9 | 10.8± 1.0 | 11.4± 1.0 | 100.0 |
| **B3** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| **Dry (g)** | 139.0 | 165.2 | 229.7 | 164.9 | 66.5 | 5215.2 |
| **Cum. Dry (g)** | 139.0 | 304.2 | 533.9 | 698.8 | 765.3 | 5980.5 |
| **Dry (%)** | 2.3 | 2.8 | 3.8 | 2.8 | 1.1 | 87.2 |
| **Cum. Dry (%)** | 2.3± 0.1 | 5.1± 0.2 | 8.9± 0.2 | 11.7± 0.2 | 12.8± 0.2 | 100.0 |

***Table 1 cont.*** *Mass recoveries for fourteen UG2 chromitite samples milled to 80% <75μm. . Confidence limits for cumulative recoveries were calculated at the 95% confidence level.*

| A4 | 0-1 min. RC1 | 1-3 min. RC2 | 3-8 min. RC3 | 8-15 min. RC4 | 15-20 min. RC5 | RT |
|---|---|---|---|---|---|---|
| Dry (g) | 135.3 | 152.7 | 179.2 | 105.0 | 40.4 | 5362.1 |
| Cum. Dry (g) | 135.3 | 288.0 | 467.2 | 572.2 | 612.6 | 5974.7 |
| Dry (%) | 2.3 | 2.6 | 3.0 | 1.8 | 0.7 | 89.7 |
| Cum. Dry (%) | 2.3± 0.1 | 4.8± 0.2 | 7.8± 0.2 | 9.6± 0.4 | 10.3± 0.4 | 100.0 |
| **B4** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| Dry (g) | 141.7 | 154.4 | 175.7 | 112.6 | 47.5 | 5356.1 |
| Cum. Dry (g) | 141.7 | 296.1 | 471.8 | 584.4 | 631.9 | 5988.0 |
| Dry (%) | 2.4 | 2.6 | 2.9 | 1.9 | 0.8 | 89.4 |
| Cum. Dry (%) | 2.4± 0.3 | 4.9± 0.6 | 7.9± 0.8 | 9.8± 0.8 | 10.6± 0.7 | 100.0 |
| **A5** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| Dry (g) | 173.5 | 179.0 | 202.9 | 127.2 | 53.3 | 5242.0 |
| Cum. Dry (g) | 173.5 | 352.5 | 555.4 | 682.6 | 735.9 | 5977.9 |
| Dry (%) | 2.9 | 3.0 | 3.4 | 2.1 | 0.9 | 87.7 |
| Cum. Dry (%) | 2.9± 0.2 | 5.9± 0.2 | 9.3± 0.2 | 11.4± 0.3 | 12.3± 0.3 | 100.0 |
| **C1** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| Dry (g) | 137.9 | 166.0 | 209.0 | 135.1 | 50.0 | 5281.8 |
| Cum. Dry (g) | 137.9 | 303.9 | 512.9 | 648.0 | 698.0 | 5979.8 |
| Dry (%) | 2.3 | 2.8 | 3.5 | 2.3 | 0.8 | 88.3 |
| Cum. Dry (%) | 2.3± 0.2 | 5.1± 0.3 | 8.6± 0.3 | 10.8± 0.4 | 11.7± 0.3 | 100.0± 0.2 |
| **C2** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| Dry (g) | 170.7 | 200.6 | 243.8 | 169.7 | 70.6 | 5215.9 |
| Cum. Dry (g) | 170.7 | 371.3 | 615.1 | 784.8 | 855.4 | 6071.3 |
| Dry (%) | 2.8 | 3.3 | 4.0 | 2.8 | 1.2 | 85.9 |
| Cum. Dry (%) | 2.8± 0.1 | 6.1± 0.3 | 10.1± 0.3 | 12.9± 0.3 | 14.1± 0.3 | 100.0 |
| **C3** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| Dry (g) | 146.8 | 168.5 | 195.4 | 133.9 | 61.9 | 5319.8 |
| Cum. Dry (g) | 146.8 | 315.3 | 510.7 | 644.6 | 706.5 | 6026.3 |
| Dry (%) | 2.4 | 2.8 | 3.2 | 2.2 | 1.0 | 88.3 |
| Cum. Dry (%) | 2.4± 0.2 | 5.2± 0.3 | 8.5± 0.5 | 10.7± 0.5 | 11.7± 0.6 | 100.0 |

***Table 1 cont.*** *Mass recoveries for fourteen UG2 chromitite samples milled to 80% <75µm. Confidence limits for cumulative recoveries were calculated at the 95% confidence level.*

| C4 | 0-1 min. RC1 | 1-3 min. RC2 | 3-8 min. RC3 | 8-15 min. RC4 | 15-20 min. RC5 | RT |
|---|---|---|---|---|---|---|
| **Dry (g)** | 180.4 | 237.0 | 259.3 | 148.1 | 57.6 | 5108.5 |
| **Cum. Dry (g)** | 180.4 | 417.4 | 676.7 | 824.8 | 882.4 | 5990.9 |
| **Dry (%)** | 3.0 | 4.0 | 4.3 | 2.5 | 1.0 | 85.3 |
| **Cum. Dry (%)** | 3.0± 0.1 | 7.0± 0.1 | 11.3± 0.3 | 13.8± 0.4 | 14.7± 0.5 | 100.0 |
| **C5** | **0-1 min. RC1** | **1-3 min. RC2** | **3-8 min. RC3** | **8-15 min. RC4** | **15-20 min. RC5** | **RT** |
| **Dry (g)** | 119.1 | 151.5 | 201.8 | 137.4 | 58.1 | 5318.3 |
| **Cum. Dry (g)** | 119.1 | 270.6 | 472.4 | 609.8 | 667.9 | 5986.2 |
| **Dry (%)** | 2.0 | 2.5 | 3.4 | 2.3 | 1.0 | 88.8 |
| **Cum. Dry (%)** | 2.0± 0.1 | 4.5± 0.2 | 7.9± 0.2 | 10.2± 0.2 | 11.2± 0.3 | 100.0 |

***Table 2*** *$Cr_2O_3$ recovery from fourteen UG2 chromitite samples milled to 80% <75µm.*

| A2 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 18.7 | 18.7 | 1.7 | 1.7 | 40 |
| *RC2* | 19.4 | 19.1 | 2.0 | 3.7 | 41 |
| *RC3* | 19.3 | 19.2 | 1.9 | 5.6 | 41 |
| *RC4* | 19.5 | 19.2 | 1.0 | 6.5 | 41 |
| *RC5* | 19.3 | 19.2 | 0.3 | 6.8 | 41 |
| *RT* | 30.4 | 29.2 | 93.2 | 100.0 | 65 |

*$Cr_2O_3$ calculated = 29.2%  $Cr_2O_3$ assay = 29.1%  Difference = 0.1% (%Difference = 0%)*

| B2 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 12.2 | 12.2 | 1.6 | 1.6 | 26 |
| *RC2* | 12.8 | 12.6 | 2.3 | 3.9 | 27 |
| *RC3* | 12.8 | 12.6 | 2.4 | 6.3 | 27 |
| *RC4* | 12.9 | 12.7 | 1.1 | 7.4 | 27 |
| *RC5* | 12.6 | 12.7 | 0.4 | 7.8 | 27 |
| *RT* | 21.8 | 20.6 | 92.2 | 100.0 | 46 |

*$Cr_2O_3$ calculated = 20.6%  $Cr_2O_3$ assay = 20.9%  Difference = 0.3% (%Difference = 1%)*

| A1 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 21.9 | 21.9 | 2.8 | 2.8 | 47 |
| *RC2* | 21.8 | 21.9 | 1.8 | 4.5 | 46 |
| *RC3* | 22.6 | 22.1 | 2.1 | 6.6 | 48 |
| *RC4* | 22.6 | 22.2 | 1.2 | 7.8 | 48 |
| *RC5* | 22.4 | 22.2 | 0.4 | 8.2 | 48 |
| *RT* | 30.5 | 29.6 | 91.8 | 100.0 | 65 |

*$Cr_2O_3$ calculated = 29.6%  $Cr_2O_3$ assay = 29.3%  Difference = 0.6% (%Difference = 1%)*

| B1 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 13.2 | 13.2 | 1.9 | 1.9 | 28 |
| *RC2* | 14.3 | 13.6 | 1.3 | 3.2 | 30 |
| *RC3* | 14.5 | 13.9 | 1.5 | 4.7 | 31 |
| *RC4* | 14.6 | 14.0 | 0.9 | 5.6 | 31 |
| *RC5* | 14.5 | 14.0 | 0.3 | 5.9 | 31 |
| *RT* | 27.2 | 25.8 | 94.1 | 100.0 | 58 |

*$Cr_2O_3$ calculated = 25.8%  $Cr_2O_3$ assay = 25.1%  Difference = 0.7% (%Difference = 3%)*

***Table 2 cont.*** *$Cr_2O_3$ recovery from fourteen UG2 chromitite samples milled to 80% <75µm.*

| A3 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 24.9 | 24.9 | 2.2 | 2.2 | 53 |
| *RC2* | 25.8 | 25.3 | 2.2 | 4.4 | 55 |
| *RC3* | 25.6 | 25.4 | 2.4 | 6.8 | 54 |
| *RC4* | 25.8 | 25.5 | 1.3 | 8.1 | 55 |
| *RC5* | 25.5 | 25.5 | 0.5 | 8.6 | 54 |
| *RT* | 35.0 | 33.9 | 91.4 | 100.0 | 74 |

*$Cr_2O_3$ calculated = 33.9%  $Cr_2O_3$ assay = 33.8%  Difference = 0.1% (%Difference = 0%)*

| B3 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC-1* | 20.1 | 20.1 | 1.5 | 1.5 | 43 |
| *RC-2* | 20.4 | 20.3 | 1.7 | 3.3 | 43 |
| *RC-3* | 20.6 | 20.4 | 2.0 | 5.2 | 44 |
| *RC-4* | 20.1 | 20.3 | 1.2 | 6.4 | 43 |
| *RC-5* | 20.4 | 20.3 | 0.5 | 7.0 | 43 |
| *RT* | 32.1 | 30.9 | 93.1 | 100.0 | 68 |

*$Cr_2O_3$ calculated = 30.9%  $Cr_2O_3$ assay = 30.7%  Difference = 0.2% (%Difference = 1%)*

| A4 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 25.1 | 25.1 | 1.6 | 1.6 | 53 |
| *RC2* | 25.4 | 25.3 | 1.9 | 3.5 | 54 |
| *RC3* | 25.8 | 25.5 | 2.2 | 5.7 | 55 |
| *RC4* | 26.0 | 25.6 | 1.3 | 7.0 | 55 |
| *RC5* | 26.7 | 25.6 | 0.5 | 7.5 | 57 |
| *RT* | 35.9 | 34.9 | 92.5 | 100.0 | 76 |

*$Cr_2O_3$ calculated = 34.9%  $Cr_2O_3$ assay = 34.5%  Difference = 0.4% (%Difference = 1%)*

| B4 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 23.0 | 23.0 | 1.6 | 1.6 | 49 |
| *RC2* | 24.2 | 23.7 | 2.0 | 3.7 | 51 |
| *RC3* | 24.4 | 24.0 | 2.8 | 6.5 | 52 |
| *RC4* | 24.4 | 24.1 | 2.0 | 8.5 | 52 |
| *RC5* | 24.8 | 24.1 | 0.8 | 9.4 | 53 |
| *RT* | 34.3 | 33.0 | 90.6 | 100.0 | 73 |

*$Cr_2O_3$ calculated = 33.0%  $Cr_2O_3$ assay = 32.9%  Difference = 0.1% (%Difference = 0%)*

| A5 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 16.9 | 16.9 | 1.8 | 1.8 | 36 |
| *RC2* | 17.8 | 17.4 | 1.9 | 3.7 | 38 |
| *RC3* | 18.7 | 17.9 | 2.3 | 5.9 | 40 |
| *RC4* | 19.3 | 18.1 | 1.5 | 7.4 | 41 |
| *RC5* | 20.0 | 18.3 | 0.6 | 8.0 | 43 |
| *RT* | 29.5 | 28.1 | 92.0 | 100.0 | 63 |

*$Cr_2O_3$ calculated = 28.1%  $Cr_2O_3$ assay = 27.7%  Difference = 0.4% (%Difference = 1%)*

***Table 2 cont.*** *$Cr_2O_3$ recovery from fourteen UG2 chromitite samples milled to 80% <75µm.*

| C1 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 15.8 | 15.8 | 1.1 | 1.1 | 34 |
| *RC2* | 17.6 | 16.8 | 1.4 | 2.5 | 37 |
| *RC3* | 19.4 | 17.9 | 2.0 | 4.4 | 41 |
| *RC4* | 21.4 | 18.6 | 1.4 | 5.8 | 45 |
| *RC5* | 22.0 | 18.8 | 0.5 | 6.4 | 47 |
| *RT* | 36.7 | 34.6 | 93.7 | 100.0 | 78 |

*$Cr_2O_3$ calculated = 34.6%  $Cr_2O_3$ assay = 34.6%  Difference = 0.0% (%Difference = 0%)*

| C2 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 16.3 | 16.3 | 1.5 | 1.5 | 35 |
| *RC2* | 17.1 | 16.7 | 1.8 | 3.3 | 36 |
| *RC3* | 17.9 | 17.2 | 2.3 | 5.6 | 38 |
| *RC4* | 19.1 | 17.6 | 1.7 | 7.3 | 41 |
| *RC5* | 19.3 | 17.7 | 0.7 | 8.0 | 41 |
| *RT* | 33.5 | 31.3 | 92.0 | 100.0 | 71 |

*$Cr_2O_3$ calculated = 31.3%  $Cr_2O_3$ assay = 31.8%  Difference = 0.5% (%Difference = 2%)*

| C3 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 14.1 | 14.1 | 1.1 | 1.1 | 30 |
| *RC2* | 14.8 | 14.5 | 1.2 | 2.3 | 31 |
| *RC3* | 15.8 | 15.0 | 1.6 | 3.9 | 34 |
| *RC4* | 17.3 | 15.5 | 1.2 | 5.1 | 37 |
| *RC5* | 17.8 | 15.7 | 0.6 | 5.7 | 38 |
| *RT* | 34.7 | 32.5 | 94.4 | 100.0 | 74 |

*$Cr_2O_3$ calculated = 32.5%  $Cr_2O_3$ assay = 32.4%  Difference = 0.1% (%Difference = 0%)*

| C4 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 17.2 | 17.2 | 2.0 | 2.0 | 37 |
| *RC2* | 17.7 | 17.4 | 1.3 | 3.3 | 38 |
| *RC3* | 18.2 | 17.7 | 1.6 | 4.9 | 39 |
| *RC4* | 19.0 | 17.9 | 1.0 | 5.8 | 40 |
| *RC5* | 18.8 | 17.9 | 0.3 | 6.2 | 40 |
| *RT* | 33.3 | 31.6 | 93.8 | 100.0 | 71 |

*$Cr_2O_3$ calculated = 31.6%  $Cr_2O_3$ assay = 31.2%  Difference = 0.4% (%Difference = 1%)*

| C5 | $Cr_2O_3$ content % | $Cr_2O_3$ content cum. % | $Cr_2O_3$ distr. % | $Cr_2O_3$ distr. cum. % | Chromite mass % |
|---|---|---|---|---|---|
| *RC1* | 20.7 | 20.7 | 1.2 | 1.2 | 44 |
| *RC2* | 21.6 | 21.2 | 1.6 | 2.8 | 46 |
| *RC3* | 22.0 | 21.5 | 2.2 | 5.0 | 47 |
| *RC4* | 22.8 | 21.8 | 1.6 | 6.6 | 48 |
| *RC5* | 22.8 | 21.9 | 0.7 | 7.3 | 48 |
| *RT* | 35.2 | 33.7 | 92.8 | 100.0 | 75 |

*$Cr_2O_3$ calculated = 33.7%  $Cr_2O_3$ assay = 33.8%  Difference = 0.1% (%Difference = 0%)*

***Table 3*** *Silicate gangue recoveries from fourteen UG2 chromitite samples at a grind of 80% <75μm.*

| **A1** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 119.9 | 119.9 | 5.4 | 5.4 |
| *RC2* | 77.3 | 197.2 | 3.5 | 8.9 |
| *RC3* | 84.4 | 281.6 | 3.8 | 12.7 |
| *RC4* | 48.7 | 330.3 | 2.2 | 14.9 |
| *RC5* | 18.1 | 348.4 | 0.8 | 15.7 |
| *RT* | 1873.0 | 2221.4 | 84.3 | 100.0 |

| **A2** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 95.5 | 95.5 | 4.2 | 4.2 |
| *RC2* | 105.8 | 201.3 | 4.7 | 8.9 |
| *RC3* | 100.9 | 302.2 | 4.4 | 13.3 |
| *RC4* | 49.7 | 352.0 | 2.2 | 15.5 |
| *RC5* | 17.5 | 369.4 | 0.8 | 16.3 |
| *RT* | 1899.3 | 2268.7 | 83.7 | 100.0 |

| **B1** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 156.8 | 156.8 | 5.8 | 5.8 |
| *RC2* | 98.3 | 255.1 | 3.6 | 9.4 |
| *RC3* | 112.8 | 368.0 | 4.2 | 13.6 |
| *RC4* | 67.1 | 435.1 | 2.5 | 16.1 |
| *RC5* | 22.5 | 457.5 | 0.8 | 16.9 |
| *RT* | 2252.6 | 2710.1 | 83.1 | 100.0 |

| **B2** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 118.6 | 118.6 | 3.5 | 3.5 |
| *RC2* | 164.4 | 283.0 | 4.9 | 8.4 |
| *RC3* | 166.8 | 449.8 | 5.0 | 13.4 |
| *RC4* | 77.4 | 527.2 | 2.3 | 15.7 |
| *RC5* | 28.1 | 555.4 | 0.8 | 16.5 |
| *RT* | 2812.7 | 3368.0 | 83.5 | 100.0 |

| **A3** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 84.6 | 84.6 | 5.1 | 5.1 |
| *RC2* | 78.6 | 163.2 | 4.7 | 9.8 |
| *RC3* | 87.6 | 250.7 | 5.2 | 15.0 |
| *RC4* | 45.5 | 296.3 | 2.7 | 17.7 |
| *RC5* | 16.9 | 313.2 | 1.0 | 18.7 |
| *RT* | 1359.6 | 1672.9 | 81.3 | 100.0 |

***Table 3 cont.*** *Silicate gangue recoveries from fourteen UG2 chromitite samples at a grind of 80% <75µm.*

| **A4** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 63.1 | 63.1 | 4.1 | 4.1 |
| *RC2* | 70.3 | 133.4 | 4.5 | 8.6 |
| *RC3* | 80.9 | 214.3 | 5.2 | 13.8 |
| *RC4* | 47.0 | 261.3 | 3.0 | 16.9 |
| *RC5* | 17.5 | 278.8 | 1.1 | 18.0 |
| *RT* | 1270.5 | 1549.3 | 82.0 | 100.0 |

| **B3** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 81.2 | 81.2 | 3.9 | 3.9 |
| *RC2* | 87.5 | 168.6 | 4.2 | 8.2 |
| *RC3* | 98.8 | 267.4 | 4.8 | 13.0 |
| *RC4* | 64.5 | 331.9 | 3.1 | 16.1 |
| *RC5* | 26.9 | 358.8 | 1.3 | 17.4 |
| *RT* | 1701.7 | 2060.5 | 82.6 | 100.0 |

| **B4** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 71.0 | 71.0 | 4.0 | 4.0 |
| *RC2* | 80.2 | 151.3 | 4.5 | 8.5 |
| *RC3* | 110.6 | 261.8 | 6.2 | 14.7 |
| *RC4* | 79.6 | 341.4 | 4.5 | 19.1 |
| *RC5* | 31.4 | 372.8 | 1.8 | 20.9 |
| *RT* | 1413.1 | 1785.9 | 79.1 | 100.0 |

| **A5** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 111.2 | 111.2 | 4.6 | 4.6 |
| *RC2* | 111.3 | 222.5 | 4.6 | 9.2 |
| *RC3* | 122.3 | 344.7 | 5.1 | 14.3 |
| *RC4* | 75.0 | 419.7 | 3.1 | 17.4 |
| *RC5* | 30.6 | 450.4 | 1.3 | 18.7 |
| *RT* | 1960.7 | 2411.1 | 81.3 | 100.0 |

| **C1** | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 91.6 | 91.6 | 5.8 | 5.8 |
| *RC2* | 103.9 | 195.5 | 6.6 | 12.4 |
| *RC3* | 122.8 | 318.3 | 7.8 | 20.1 |
| *RC4* | 73.6 | 392.0 | 4.7 | 24.8 |
| *RC5* | 26.6 | 418.6 | 1.7 | 26.5 |
| *RT* | 1161.7 | 1580.3 | 73.5 | 100.0 |

***Table 3 cont.*** *Silicate gangue recoveries from fourteen UG2 chromitite samples at a grind of 80% <75µm.*

| C2 | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 111.6 | 111.6 | 5.5 | 5.5 |
| *RC2* | 127.7 | 239.2 | 6.3 | 11.8 |
| *RC3* | 151.3 | 390.6 | 7.4 | 19.2 |
| *RC4* | 100.8 | 491.4 | 5.0 | 24.1 |
| *RC5* | 41.6 | 533.0 | 2.0 | 26.2 |
| *RT* | 1501.9 | 2034.9 | 73.8 | 100.0 |

| C3 | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 102.8 | 102.8 | 5.5 | 5.5 |
| *RC2* | 115.5 | 218.3 | 6.2 | 11.7 |
| *RC3* | 129.8 | 348.1 | 6.9 | 18.6 |
| *RC4* | 84.8 | 432.9 | 4.5 | 23.2 |
| *RC5* | 38.5 | 471.4 | 2.1 | 25.2 |
| *RT* | 1396.2 | 1867.5 | 74.8 | 100.0 |

| C4 | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 138.3 | 138.3 | 7.0 | 7.0 |
| *RC2* | 88.1 | 226.4 | 4.5 | 11.5 |
| *RC3* | 100.0 | 326.4 | 5.1 | 16.6 |
| *RC4* | 58.0 | 384.4 | 3.0 | 19.6 |
| *RC5* | 19.5 | 403.9 | 1.0 | 20.6 |
| *RT* | 1560.3 | 1964.2 | 79.4 | 100.0 |

| C5 | *Silicate content g* | *Silicate content cum. g* | *Silicate distr. %* | *Silicate distr. cum. %* |
|---|---|---|---|---|
| *RC1* | 66.7 | 66.7 | 3.9 | 3.9 |
| *RC2* | 81.9 | 148.6 | 4.8 | 8.8 |
| *RC3* | 107.4 | 256.1 | 6.3 | 15.1 |
| *RC4* | 70.8 | 326.9 | 4.2 | 19.3 |
| *RC5* | 29.9 | 356.8 | 1.8 | 21.0 |
| *RT* | 1339.3 | 1696.1 | 79.0 | 100.0 |

***Table 4*** *Cu recoveries from fourteen test samples. Differences between calculated and assayed Cu values for feed material are expressed as relative %.*

| **A2** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.130 | 0.130 | 56.88 | 56.88 |
| *RC2* | 0.028 | 0.076 | 13.92 | 70.80 |
| *RC3* | 0.018 | 0.056 | 8.50 | 79.30 |
| *RC4* | 0.016 | 0.051 | 3.75 | 83.05 |
| *RC5* | 0.017 | 0.049 | 1.39 | 84.44 |
| *RT* | 0.001 | 0.006 | 15.56 | 100.00 |

*Cu calculated = 0.006% Cu assay = 0.005% %Difference = 21%*

| **B2** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.110 | 0.110 | 57.85 | 57.85 |
| *RC2* | 0.015 | 0.054 | 11.13 | 68.98 |
| *RC3* | 0.012 | 0.039 | 9.03 | 78.02 |
| *RC4* | 0.010 | 0.034 | 3.51 | 81.52 |
| *RC5* | 0.010 | 0.033 | 1.26 | 82.78 |
| *RT* | 0.001 | 0.005 | 17.22 | 100.00 |

*Cu calculated = 0.001% Cu assay = 0.004% %Difference = 27%*

| **A1** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.120 | 0.12 | 62.21 | 62.21 |
| *RC2* | 0.036 | 0.09 | 11.88 | 74.09 |
| *RC3* | 0.020 | 0.07 | 7.17 | 81.26 |
| *RC4* | 0.018 | 0.06 | 3.65 | 84.91 |
| *RC5* | 0.014 | 0.06 | 1.16 | 86.08 |
| *RT* | 0.001 | 0.007 | 13.92 | 100.00 |

*Cu calculated = 0.007% Cu assay = 0.007% %Difference = 5%*

| **B1** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.220 | 0.220 | 75.68 | 75.68 |
| *RC2* | 0.031 | 0.146 | 6.91 | 82.59 |
| *RC3* | 0.020 | 0.106 | 5.15 | 87.73 |
| *RC4* | 0.019 | 0.093 | 2.92 | 90.65 |
| *RC5* | 0.018 | 0.089 | 0.92 | 91.57 |
| *RT* | 0.001 | 0.011 | 8.43 | 100.00 |

*Cu calculated = 0.011% Cu assay = 0.010% %Difference = 6%*

| **A3** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.220 | 0.220 | 55.79 | 55.79 |
| *RC2* | 0.058 | 0.140 | 14.24 | 70.03 |
| *RC3* | 0.034 | 0.103 | 9.22 | 79.25 |
| *RC4* | 0.031 | 0.092 | 4.41 | 83.66 |
| *RC5* | 0.026 | 0.088 | 1.36 | 85.01 |
| *RT* | 0.002 | 0.012 | 14.99 | 100.00 |

*Cu calculated = 0.012% Cu assay = 0.011% %Difference = 7%*

***Table 4 cont.*** *Cu recoveries from fourteen test samples. Differences between calculated and assayed Cu values for feed material are expressed as relative %.*

| **B3** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.279 | 0.279 | 67.53 | 67.53 |
| *RC2* | 0.050 | 0.160 | 13.19 | 80.72 |
| *RC3* | 0.020 | 0.108 | 6.00 | 86.72 |
| *RC4* | 0.016 | 0.090 | 3.08 | 89.80 |
| *RC5* | 0.013 | 0.084 | 1.05 | 90.85 |
| *RT* | 0.001 | 0.010 | 9.15 | 100.00 |

*Cu calculated = 0.010%  Cu assay = 0.009%  %Difference = 9%*

| **A4** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.266 | 0.266 | 50.85 | 50.85 |
| *RC2* | 0.082 | 0.168 | 17.69 | 68.55 |
| *RC3* | 0.043 | 0.120 | 10.89 | 79.44 |
| *RC4* | 0.028 | 0.103 | 4.15 | 83.59 |
| *RC5* | 0.022 | 0.098 | 1.26 | 84.85 |
| *RT* | 0.002 | 0.012 | 15.15 | 100.00 |

*Cu calculated = 0.012%  Cu assay = 0.011%  %Difference = 8%*

| **B4** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.457 | 0.457 | 63.86 | 63.86 |
| *RC2* | 0.083 | 0.254 | 13.80 | 77.66 |
| *RC3* | 0.041 | 0.162 | 9.51 | 87.17 |
| *RC4* | 0.021 | 0.129 | 3.47 | 90.64 |
| *RC5* | 0.018 | 0.119 | 1.23 | 91.87 |
| *RT* | 0.002 | 0.017 | 8.13 | 100.00 |

*Cu calculated = 0.017%  Cu assay = 0.017%  %Difference = 2%*

| **A5** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.090 | 0.090 | 52.36 | 52.36 |
| *RC2* | 0.022 | 0.055 | 13.20 | 65.57 |
| *RC3* | 0.014 | 0.040 | 9.53 | 75.09 |
| *RC4* | 0.013 | 0.035 | 5.54 | 80.64 |
| *RC5* | 0.010 | 0.033 | 1.79 | 82.42 |
| *RT* | 0.001 | 0.005 | 17.58 | 100.00 |

*Cu calculated = 0.005%  Cu assay = 0.004%  %Difference = 25%*

| **C1** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.095 | 0.095 | 31.48 | 31.48 |
| *RC2* | 0.027 | 0.058 | 10.86 | 42.34 |
| *RC3* | 0.017 | 0.041 | 8.40 | 50.74 |
| *RC4* | 0.015 | 0.035 | 4.74 | 55.49 |
| *RC5* | 0.015 | 0.034 | 1.81 | 57.30 |
| *RT* | 0.003 | 0.007 | 42.70 | 100.00 |

*Cu calculated = 0.007%  Cu assay = 0.006%  %Difference = 19%*

***Table 4 cont.*** *Cu recoveries from fourteen test samples. Differences between calculated and assayed Cu values for feed material are expressed as relative %.*

| **C2** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.076 | 0.076 | 34.16 | 34.16 |
| *RC2* | 0.023 | 0.047 | 11.95 | 46.11 |
| *RC3* | 0.015 | 0.034 | 9.36 | 55.47 |
| *RC4* | 0.013 | 0.029 | 5.80 | 61.26 |
| *RC5* | 0.011 | 0.028 | 2.15 | 63.41 |
| *RT* | 0.003 | 0.006 | 36.59 | 100.00 |

*Cu calculated = 0.006%  Cu assay = 0.004%  %Difference = 40%*

| **C3** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.068 | 0.068 | 28.30 | 28.30 |
| *RC2* | 0.023 | 0.044 | 11.16 | 39.46 |
| *RC3* | 0.015 | 0.033 | 8.46 | 47.91 |
| *RC4* | 0.013 | 0.029 | 5.11 | 53.02 |
| *RC5* | 0.013 | 0.027 | 2.29 | 55.31 |
| *RT* | 0.003 | 0.006 | 44.69 | 100.00 |

*Cu calculated = 0.006%  Cu assay = 0.005%  %Difference = 17%*

| **C4** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.041 | 0.041 | 30.59 | 30.59 |
| *RC2* | 0.014 | 0.026 | 13.91 | 44.51 |
| *RC3* | 0.010 | 0.020 | 10.45 | 54.96 |
| *RC4* | 0.009 | 0.018 | 5.51 | 60.47 |
| *RC5* | 0.008 | 0.017 | 1.91 | 62.38 |
| *RT* | 0.002 | 0.004 | 37.62 | 100.00 |

*Cu calculated = 0.004%  Cu assay = 0.003%  %Difference = 38%*

| **C5** | *Cu content %* | *Cu content cum. %* | *Cu distribution %* | *Cu distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.088 | 0.088 | 38.68 | 38.68 |
| *RC2* | 0.025 | 0.053 | 13.80 | 52.48 |
| *RC3* | 0.016 | 0.037 | 12.14 | 64.63 |
| *RC4* | 0.011 | 0.031 | 5.79 | 70.42 |
| *RC5* | 0.010 | 0.030 | 2.18 | 72.60 |
| *RT* | 0.001 | 0.005 | 27.40 | 100.00 |

*Cu calculated = 0.005%  Cu assay = 0.003%  %  Difference = 32%*

***Table 5*** ***Kelsall flotation constants for Cu recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.***

| **Cu** | *U* | $\phi$ | $K_f$ | $K_s$ | *Loss* |
|---|---|---|---|---|---|
| *A2* | 85.6 | 0.28 | 2.02 | 0.18 | 0.10 |
| *B2* | 83.1 | 0.31 | 2.06 | 0.2 | 0.12 |
| *A1* | 86.8 | 0.24 | 2.24 | 0.16 | 0.02 |
| *B1* | 92.3 | 0.17 | 3.08 | 0.15 | 0.00 |
| *A3* | 85.8 | 0.30 | 2.01 | 0.17 | 0.03 |
| *B3* | 91.5 | 0.19 | 2.07 | 0.16 | 0.02 |
| *A4* | 85.2 | 0.36 | 1.73 | 0.21 | 0.08 |
| *B4* | 92.6 | 0.24 | 2.05 | 0.14 | 0.01 |
| *A5* | 84.0 | 0.34 | 2.04 | 0.14 | 0.01 |
| *C1* | 58.7 | 0.42 | 1.76 | 0.14 | 0.05 |
| *C2* | 65.5 | 0.43 | 1.74 | 0.13 | 0.03 |
| *C3* | 57.5 | 0.44 | 1.57 | 0.12 | 0.11 |
| *C4* | 63.7 | 0.46 | 1.49 | 0.15 | 0.05 |
| *C5* | 73.6 | 0.47 | 1.92 | 0.17 | 0.19 |
| *Avg.* | 79.0 | 0.33 | 1.98 | 0.16 | 0.06 |

*Loss = (Observed – Predicted)* $^2$

***Table 6*** *Acid soluble Ni recoveries from fourteen test samples. Differences between calculated and assayed Ni values for feed material are expressed as relative %.*

| **A2** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.320 | 0.320 | 28.86 | 28.86 |
| *RC2* | 0.140 | 0.224 | 14.35 | 43.21 |
| *RC3* | 0.108 | 0.185 | 10.52 | 53.73 |
| *RC4* | 0.101 | 0.173 | 4.88 | 58.61 |
| *RC5* | 0.100 | 0.170 | 1.68 | 60.29 |
| *RT* | 0.013 | 0.029 | 39.71 | 100.00 |

*Ni calculated = 0.029% Ni assay = 0.029% %Difference = 1%*

| **B2** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.280 | 0.280 | 24.56 | 24.56 |
| *RC2* | 0.089 | 0.168 | 11.03 | 35.60 |
| *RC3* | 0.077 | 0.134 | 9.72 | 45.31 |
| *RC4* | 0.073 | 0.125 | 4.29 | 49.61 |
| *RC5* | 0.075 | 0.123 | 1.57 | 51.18 |
| *RT* | 0.017 | 0.030 | 48.82 | 100.00 |

*Ni calculated = 0.030% Ni assay = 0.030% %Difference = 1%*

| **A1** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.392 | 0.392 | 35.66 | 35.66 |
| *RC2* | 0.175 | 0.307 | 10.16 | 45.82 |
| *RC3* | 0.120 | 0.251 | 7.77 | 53.59 |
| *RC4* | 0.105 | 0.229 | 3.84 | 57.43 |
| *RC5* | 0.146 | 0.225 | 2.07 | 59.50 |
| *RT* | 0.019 | 0.042 | 40.50 | 100.00 |

*Ni calculated = 0.042% Ni assay = 0.041% %Difference = 2%*

| **B1** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.405 | 0.405 | 21.82 | 21.82 |
| *RC2* | 0.209 | 0.328 | 7.29 | 29.11 |
| *RC3* | 0.159 | 0.275 | 6.39 | 35.50 |
| *RC4* | 0.160 | 0.257 | 3.84 | 39.33 |
| *RC5* | 0.161 | 0.252 | 1.29 | 40.62 |
| *RT* | 0.045 | 0.068 | 59.38 | 100.00 |

*Ni calculated = 0.068% Ni assay = 0.072% %Difference = 6%*

| **A3** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.450 | 0.450 | 30.24 | 30.24 |
| *RC2* | 0.200 | 0.327 | 12.98 | 43.23 |
| *RC3* | 0.145 | 0.263 | 10.42 | 53.65 |
| *RC4* | 0.130 | 0.242 | 4.90 | 58.55 |
| *RC5* | 0.126 | 0.236 | 1.74 | 60.28 |
| *RT* | 0.020 | 0.045 | 39.72 | 100.00 |

*Ni calculated = 0.045% Ni assay = 0.044% %Difference = 1%*

***Table 6 cont.*** *Acid soluble Ni recoveries from fourteen test samples. Differences between calculated and assayed Ni values for feed material are expressed as relative %.*

| **A4** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.648 | 0.648 | 25.36 | 25.36 |
| *RC2* | 0.370 | 0.501 | 16.34 | 41.71 |
| *RC3* | 0.253 | 0.406 | 13.12 | 54.82 |
| *RC4* | 0.199 | 0.368 | 6.04 | 60.87 |
| *RC5* | 0.163 | 0.354 | 1.90 | 62.77 |
| *RT* | 0.024 | 0.058 | 37.23 | 100.00 |

*Ni calculated = 0.058%  Ni assay = 0.055%  %Difference = 5%*

| **A5** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.232 | 0.232 | 17.85 | 17.85 |
| *RC2* | 0.133 | 0.182 | 10.56 | 28.40 |
| *RC3* | 0.109 | 0.155 | 9.81 | 38.21 |
| *RC4* | 0.107 | 0.146 | 6.04 | 44.25 |
| *RC5* | 0.097 | 0.143 | 2.29 | 46.54 |
| *RT* | 0.023 | 0.038 | 53.46 | 100.00 |

*Ni calculated = 0.038%  Ni assay = 0.035%  %Difference = 8%*

| **B3** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.612 | 0.612 | 35.25 | 35.25 |
| *RC2* | 0.190 | 0.392 | 11.92 | 47.17 |
| *RC3* | 0.130 | 0.294 | 9.28 | 56.45 |
| *RC4* | 0.105 | 0.258 | 4.81 | 61.26 |
| *RC5* | 0.090 | 0.245 | 1.74 | 62.99 |
| *RT* | 0.017 | 0.041 | 37.01 | 100.00 |

*Ni calculated = 0.041%  Ni assay = 0.041%  %Difference = 0%*

| **B4** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.738 | 0.738 | 31.58 | 31.58 |
| *RC2* | 0.279 | 0.489 | 14.20 | 45.78 |
| *RC3* | 0.211 | 0.369 | 14.89 | 60.67 |
| *RC4* | 0.145 | 0.316 | 7.34 | 68.01 |
| *RC5* | 0.119 | 0.299 | 2.43 | 70.44 |
| *RT* | 0.018 | 0.054 | 29.56 | 100.00 |

*Ni calculated = 0.054%  Ni assay = 0.056%  %Difference = 3%*

***Table 6 cont.*** *Acid soluble Ni recoveries from fourteen test samples. Differences between calculated and assayed Ni values for feed material are expressed as relative %.*

| **C1** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.201 | 0.201 | 17.11 | 17.11 |
| *RC2* | 0.099 | 0.145 | 10.12 | 27.23 |
| *RC3* | 0.080 | 0.118 | 10.34 | 37.58 |
| *RC4* | 0.078 | 0.110 | 6.53 | 44.10 |
| *RC5* | 0.079 | 0.108 | 2.45 | 46.55 |
| *RT* | 0.016 | 0.027 | 53.45 | 100.00 |

*Ni calculated = 0.027% Ni assay = 0.028% %Difference = 4%*

| **C2** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.228 | 0.228 | 19.35 | 19.35 |
| *RC2* | 0.107 | 0.163 | 10.67 | 30.02 |
| *RC3* | 0.093 | 0.135 | 11.21 | 41.23 |
| *RC4* | 0.089 | 0.125 | 7.51 | 48.73 |
| *RC5* | 0.083 | 0.121 | 2.91 | 51.65 |
| *RT* | 0.019 | 0.033 | 48.35 | 100.00 |

*Ni calculated = 0.033% Ni assay = 0.030% %Difference = 10%*

| **C3** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.150 | 0.150 | 12.62 | 12.62 |
| *RC2* | 0.090 | 0.118 | 8.69 | 21.31 |
| *RC3* | 0.083 | 0.105 | 9.29 | 30.60 |
| *RC4* | 0.083 | 0.100 | 6.37 | 36.97 |
| *RC5* | 0.084 | 0.099 | 2.98 | 39.95 |
| *RT* | 0.020 | 0.029 | 60.05 | 100.00 |

*Ni calculated = 0.029% Ni assay = 0.029% %Difference = 0%*

| **C4** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.138 | 0.138 | 15.14 | 15.14 |
| *RC2* | 0.083 | 0.107 | 11.97 | 27.11 |
| *RC3* | 0.071 | 0.093 | 11.22 | 38.34 |
| *RC4* | 0.070 | 0.089 | 6.35 | 44.68 |
| *RC5* | 0.071 | 0.088 | 2.49 | 47.17 |
| *RT* | 0.017 | 0.027 | 52.83 | 100.00 |

*Ni calculated = 0.027% Ni assay = 0.026% %Difference = 6%*

| **C5** | *Ni content %* | *Ni content cum. %* | *Ni distribution %* | *Ni distribution cum. %* |
|---|---|---|---|---|
| *RC1* | 0.231 | 0.231 | 16.32 | 16.32 |
| *RC2* | 0.111 | 0.164 | 9.93 | 26.25 |
| *RC3* | 0.081 | 0.128 | 9.66 | 35.92 |
| *RC4* | 0.080 | 0.117 | 6.49 | 42.40 |
| *RC5* | 0.078 | 0.114 | 2.69 | 45.10 |
| *RT* | 0.017 | 0.028 | 54.90 | 100.00 |

*Ni calculated = 0.028% Ni assay = 0.028% %Difference = 1%*

***Table** 7 Kelsall flotation constants for acid soluble Ni recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

| Ni (a.s.) | $U$ | $\phi$ | $K_f$ | $K_s$ | Loss |
|---|---|---|---|---|---|
| *A1* | 60.6 | 0.4 | 1.9 | 0.1 | 0.3 |
| *A2* | 61.2 | 0.5 | 1.4 | 0.2 | 0.1 |
| *A3* | 61.1 | 0.5 | 1.6 | 0.2 | 0.1 |
| *B1* | 41.8 | 0.5 | 1.9 | 0.1 | 0.0 |
| *B2* | 51.8 | 0.5 | 1.7 | 0.2 | 0.1 |
| *C1* | 49.1 | 0.6 | 1.4 | 0.1 | 0.0 |
| *C2* | 55.0 | 0.6 | 1.5 | 0.1 | 0.0 |
| *C3* | 43.9 | 0.7 | 1.2 | 0.1 | 0.1 |
| *C4* | 49.5 | 0.6 | 1.0 | 0.1 | 0.1 |
| *C5* | 48.4 | 0.6 | 1.3 | 0.1 | 0.0 |
| *A4* | 63.8 | 0.6 | 1.2 | 0.2 | 0.1 |
| *A5* | 48.8 | 0.6 | 1.3 | 0.1 | 0.0 |
| *B3* | 64.1 | 0.4 | 1.8 | 0.2 | 0.1 |
| *B4* | 68.5 | 0.7 | 1.4 | 0.2 | 0.2 |
| *Avg.* | 54.8 | 0.6 | 1.5 | 0.1 | 0.1 |

***Table 8*** *PGE+Au recoveries from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| **A2** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 95.60 | 95.60 | 69.47 | 69.47 |
| *RC2* | 16.87 | 53.72 | 13.93 | 83.39 |
| *RC3* | 8.62 | 38.58 | 6.76 | 90.16 |
| *RC4* | 6.87 | 34.05 | 2.67 | 92.83 |
| *RC5* | 5.70 | 32.71 | 0.77 | 93.60 |
| *RT* | 0.26 | 3.64 | 6.40 | 100.00 |

*PGE+Au calculated = 3.64 ppm PGE+Au assay = 3.08 ppm Difference = 0.56 ppm (%Difference = 18%)*

| **B2** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 110.90 | 110.90 | 78.82 | 78.82 |
| *RC2* | 9.02 | 51.28 | 9.05 | 87.87 |
| *RC3* | 5.33 | 34.16 | 5.42 | 93.29 |
| *RC4* | 3.74 | 29.66 | 1.77 | 95.06 |
| *RC5* | 3.06 | 28.32 | 0.52 | 95.58 |
| *RT* | 0.19 | 3.75 | 4.42 | 100.00 |

*PGE+Au calculated = 3.75 ppm PGE+Au assay = 3.55 ppm Difference = 0.20 ppm (%Difference = 6%)*

| **A1** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 103.18 | 103.18 | 75.22 | 75.22 |
| *RC2* | 25.66 | 72.90 | 11.99 | 87.21 |
| *RC3* | 11.26 | 54.05 | 5.94 | 93.15 |
| *RC4* | 7.20 | 47.02 | 2.19 | 95.34 |
| *RC5* | 5.79 | 44.86 | 0.65 | 95.99 |
| *RT* | 0.23 | 5.14 | 4.01 | 100.00 |

*PGE+Au calculated = 5.14 ppm PGE+Au assay = 5.15 ppm Difference = 0.01 ppm (%Difference = 0%)*

| **B1** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 66.61 | 66.61 | 70.75 | 70.75 |
| *RC2* | 16.33 | 46.84 | 11.23 | 81.98 |
| *RC3* | 8.64 | 34.91 | 6.86 | 88.84 |
| *RC4* | 6.65 | 30.47 | 3.15 | 91.99 |
| *RC5* | 6.23 | 29.26 | 0.99 | 92.98 |
| *RT* | 0.27 | 3.43 | 7.02 | 100.00 |

*PGE+Au calculated = 3.43 ppm PGE+Au assay = 4.10 ppm Difference = 0.67 ppm (%Difference = 16%)*

***Table 8 cont.*** *PGE+Au recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

| **A3** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 125.70 | 125.70 | 60.34 | 60.34 |
| *RC2* | 32.74 | 79.97 | 15.22 | 75.56 |
| *RC3* | 17.60 | 58.02 | 9.03 | 84.59 |
| *RC4* | 13.35 | 51.05 | 3.59 | 88.19 |
| *RC5* | 7.61 | 48.70 | 0.75 | 88.94 |
| *RT* | 0.78 | 6.25 | 11.06 | 100.00 |

*PGE+Au calculated = 6.25 ppm PGE+Au assay = 5.85 ppm Difference = 0.40 ppm (%Difference = 7%)*

| **A4** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 135.05 | 135.05 | 54.72 | 54.72 |
| *RC2* | 46.63 | 88.16 | 21.32 | 76.05 |
| *RC3* | 22.55 | 63.00 | 12.10 | 88.15 |
| *RC4* | 13.05 | 53.83 | 4.10 | 92.25 |
| *RC5* | 9.58 | 50.91 | 1.16 | 93.41 |
| *RT* | 0.410 | 5.59 | 6.59 | 100.00 |

*PGE+Au calculated = 5.59 ppm PGE+Au assay = 5.02 ppm Difference = 0.57 ppm (%Difference = 11%)*

| **B3** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 156.71 | 156.71 | 69.17 | 69.17 |
| *RC2* | 33.00 | 92.20 | 15.87 | 85.04 |
| *RC3* | 13.60 | 62.93 | 7.44 | 92.49 |
| *RC4* | 6.40 | 52.04 | 2.24 | 94.73 |
| *RC5* | 3.93 | 48.42 | 0.58 | 95.31 |
| *RT* | 0.28 | 5.36 | 4.69 | 100.00 |

*PGE+Au calculated = 5.36 ppm PGE+Au assay = 4.70 ppm Difference = 0.66 ppm (%Difference = 14%)*

| **B4** | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 148.77 | 148.77 | 57.98 | 57.98 |
| *RC2* | 38.02 | 88.62 | 17.61 | 75.58 |
| *RC3* | 20.25 | 59.21 | 13.04 | 88.62 |
| *RC4* | 9.205 | 47.41 | 4.26 | 92.88 |
| *RC5* | 6.27 | 43.83 | 1.17 | 94.05 |
| *RT* | 0.41 | 5.96 | 5.95 | 100.00 |

*PGE+Au calculated = 5.96 ppm PGE+Au assay = 5.81 ppm Difference = 0.15 ppm (%Difference = 3%)*

***Table 8 cont.*** *PGE+Au recovery from fourteen samples of UG2 chromitite milled to 80% <75μm.*

| A5 | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 71.27 | 71.27 | 35.72 | 35.72 |
| *RC2* | 26.99 | 48.78 | 13.95 | 49.67 |
| *RC3* | 17.30 | 37.28 | 10.14 | 59.81 |
| *RC4* | 14.55 | 33.05 | 5.35 | 65.16 |
| *RC5* | 12.55 | 31.56 | 1.93 | 67.09 |
| *RT* | 2.17 | 5.79 | 32.91 | 100.00 |

*PGE+Au calculated = 5.79 ppm PGE+Au assay = 5.74 ppm Difference = 0.05 ppm (%Difference = 1%)*

| C1 | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 135.01 | 135.01 | 61.95 | 61.95 |
| *RC2* | 28.35 | 76.75 | 15.66 | 77.61 |
| *RC3* | 12.35 | 50.51 | 8.59 | 86.19 |
| *RC4* | 7.56 | 41.55 | 3.40 | 89.59 |
| *RC5* | 5.52 | 38.97 | 0.92 | 90.51 |
| *RT* | 0.54 | 5.03 | 9.49 | 100.00 |

*PGE+Au calculated = 5.03 ppm PGE+Au assay = 4.39 ppm Difference = 0.64 ppm (%Difference = 14%)*

| C2 | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 119.30 | 119.30 | 66.49 | 66.49 |
| *RC2* | 22.25 | 66.87 | 14.57 | 81.07 |
| *RC3* | 10.15 | 44.39 | 8.08 | 89.15 |
| *RC4* | 6.24 | 36.14 | 3.46 | 92.60 |
| *RC5* | 4.39 | 33.52 | 1.01 | 93.61 |
| *RT* | 0.375 | 5.04 | 6.39 | 100.00 |

*PGE+Au calculated = 5.04 ppm PGE+Au assay = 4.58 ppm Difference = 0.46 ppm (%Difference = 10%)*

| C3 | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 152.66 | 152.66 | 63.34 | 63.34 |
| *RC2* | 32.05 | 88.20 | 15.26 | 78.60 |
| *RC3* | 15.45 | 60.37 | 8.53 | 87.14 |
| *RC4* | 9.09 | 49.72 | 3.44 | 90.58 |
| *RC5* | 7.03 | 45.98 | 1.23 | 91.81 |
| *RT* | 0.545 | 5.87 | 8.19 | 100.00 |

*PGE+Au calculated = 5.87 ppm PGE+Au assay = 4.92 ppm Difference = 0.95 ppm (%Difference = 19%)*

***Table 8 cont.*** *PGE+Au recoveries from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| C4 | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 110.59 | 110.59 | 70.83 | 70.83 |
| *RC2* | 16.08 | 56.93 | 13.53 | 84.36 |
| *RC3* | 7.60 | 38.03 | 7.00 | 91.36 |
| *RC4* | 4.84 | 32.07 | 2.54 | 93.90 |
| *RC5* | 3.20 | 30.18 | 0.65 | 94.56 |
| *RT* | 0.300 | 4.70 | 5.44 | 100.00 |

*PGE+Au calculated = 4.70 ppm PGE+Au assay = 4.31 ppm Difference = 0.39 ppm (%Difference = 9%)*

| C5 | *PGE+Au content ppm* | *PGE+Au content cumulative ppm* | *PGE+Au dist. %* | *PGE+Au dist. cumulative %* |
|---|---|---|---|---|
| *RC1* | 176.89 | 176.89 | 69.83 | 69.83 |
| *RC2* | 28.80 | 93.98 | 14.46 | 84.29 |
| *RC3* | 11.35 | 58.68 | 7.59 | 91.88 |
| *RC4* | 6.44 | 46.91 | 2.93 | 94.81 |
| *RC5* | 4.26 | 43.20 | 0.82 | 95.63 |
| *RT* | 0.248 | 5.04 | 4.37 | 100.00 |

*PGE+Au calculated = 5.04 ppm PGE+Au assay = 4.86 ppm Difference = 0.18 ppm (%Difference = 4%)*

***Table 9*** *Kelsall flotation constants for PGE+Au recoveries from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| PGE+Au | *U* | $\phi$ | $K_f$ | $K_s$ | *Loss* |
|---|---|---|---|---|---|
| *A2* | 93.85 | 0.20 | 2.13 | 0.20 | 0.02 |
| *B2* | 95.63 | 0.16 | 2.90 | 0.24 | 0.02 |
| *A1* | 96.13 | 0.17 | 2.38 | 0.22 | 0.02 |
| *B1* | 93.44 | 0.21 | 2.45 | 0.18 | 0.02 |
| *A3* | 89.29 | 0.29 | 2.05 | 0.21 | 0.00 |
| *B3* | 95.36 | 0.22 | 2.06 | 0.25 | 0.03 |
| *A4* | 93.63 | 0.36 | 1.60 | 0.22 | 0.08 |
| *B4* | 94.19 | 0.40 | 2.17 | 0.24 | 0.10 |
| *A5* | 68.40 | 0.42 | 1.62 | 0.15 | 0.07 |
| *C1* | 90.83 | 0.27 | 1.98 | 0.21 | 0.02 |
| *C2* | 94.02 | 0.24 | 2.10 | 0.19 | 0.03 |
| *C3* | 92.15 | 0.26 | 2.01 | 0.19 | 0.10 |
| *C4* | 94.73 | 0.21 | 2.24 | 0.22 | 0.02 |
| *C5* | 95.87 | 0.22 | 2.16 | 0.21 | 0.03 |
| *Avg.* | 91.97 | 0.26 | 2.13 | 0.21 | 0.04 |

*Loss = (Observed – Predicted)* $^2$

***Table 10*** *Platinum recovery from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| **A2** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 64.13 | 64.13 | 70.87 | 70.87 |
| *RC2* | 10.90 | 35.82 | 13.69 | 84.56 |
| *RC3-5* | 5.13 | 21.77 | 10.21 | 94.76 |
| *RT* | 0.14 | 2.39 | 5.24 | 100.00 |

*Pt calculated = 2.39 ppm Pt assay = 2.13 ppm Difference = 0.26 ppm*
*Difference = 11%*

| **B2** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 65.87 | 65.87 | 79.49 | 79.49 |
| *RC2* | 5.39 | 30.48 | 9.18 | 88.67 |
| *RC3-5* | 2.81 | 16.85 | 7.91 | 96.58 |
| *RT* | 0.09 | 2.21 | 3.42 | 100.00 |

*Pt calculated = 2.21 ppm Pt assay = 2.04 ppm Difference = 0.17 ppm*
*Difference = 8%*

| **A1** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 61.83 | 61.83 | 74.97 | 74.97 |
| *RC2* | 15.48 | 43.73 | 12.03 | 87.00 |
| *RC3-5* | 5.75 | 26.98 | 9.01 | 96.02 |
| *RT* | 0.14 | 3.09 | 3.98 | 100.00 |

*Pt calculated = 3.09 ppm Pt assay = 3.08 ppm Difference = 0.18 ppm*
*Difference = 0%*

| **B1** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 39.63 | 39.63 | 71.63 | 71.63 |
| *RC2* | 8.47 | 27.38 | 9.92 | 81.54 |
| *RC3-5* | 4.32 | 17.02 | 10.49 | 92.03 |
| *RT* | 0.18 | 2.01 | 7.97 | 100.00 |

*Pt calculated = 2.01 ppm Pt assay = 2.41 ppm Difference = 0.40 ppm*
*Difference = 20%*

| **A3** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 80.85 | 80.85 | 63.31 | 63.31 |
| *RC2* | 19.8 | 50.82 | 15.01 | 78.32 |
| *RC3-5* | 9.13 | 30.70 | 13.12 | 91.44 |
| *RT* | 0.37 | 3.83 | 8.56 | 100.00 |

*Pt calculated = 3.83 ppm Pt assay = 3.67 ppm Difference = 0.16 ppm*
*Difference = 4%*

***Table 10 cont.*** *Platinum recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

| **B3** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 94.50 | 94.50 | 69.75 | 69.75 |
| *RC2* | 20.00 | 55.65 | 16.08 | 85.83 |
| *RC3-5* | 5.39 | 28.94 | 9.43 | 95.26 |
| *RT* | 0.17 | 3.21 | 4.74 | 100.00 |

*Pt calculated = 3.21 ppm Pt assay = 2.81 ppm Difference = 0.40 ppm*
*Difference = 13%*

| **A4** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 88.50 | 88.50 | 59.09 | 59.09 |
| *RC2* | 27.00 | 55.89 | 20.35 | 79.44 |
| *RC3-5* | 9.20 | 31.15 | 14.74 | 94.18 |
| *RT* | 0.22 | 3.39 | 5.82 | 100.00 |

*Pt calculated = 3.39 ppm Pt assay = 3.05 ppm Difference = 0.34 ppm*
*% Difference = 10%*

| **B4** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 92.50 | 92.50 | 62.39 | 62.39 |
| *RC2* | 21.00 | 53.67 | 16.83 | 79.22 |
| *RC3-5* | 6.91 | 25.50 | 15.46 | 94.69 |
| *RT* | 0.21 | 3.45 | 5.31 | 100.00 |

*Pt calculated = 3.45 ppm Pt assay = 3.34 ppm Difference = 0.11 ppm*
*Difference = 3%*

| **A5** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 39.50 | 39.50 | 36.63 | 36.63 |
| *RC2* | 15.10 | 27.11 | 14.45 | 51.08 |
| *RC3-5* | 8.15 | 17.23 | 16.70 | 67.78 |
| *RT* | 1.15 | 3.13 | 32.22 | 100.00 |

*Pt calculated = 3.13 ppm Pt assay = 3.13 ppm Difference = 0 ppm*
*Difference = 0 %*

| **C1** | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 92.00 | 92.00 | 62.67 | 62.67 |
| *RC2* | 19.50 | 52.40 | 15.99 | 78.66 |
| *RC3-5* | 6.68 | 26.58 | 12.99 | 91.65 |
| *RT* | 0.32 | 3.39 | 8.35 | 100.00 |

*Pt calculated = 3.39 ppm Pt assay = 3.03 ppm Difference = 0.36 ppm*
*Difference = 11%*

***Table 10 cont.*** *Platinum recovery from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| C2 | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 75.50 | 75.50 | 65.76 | 65.76 |
| *RC2* | 14.70 | 42.65 | 15.05 | 80.81 |
| *RC3-5* | 5.40 | 21.57 | 13.34 | 94.14 |
| *RT* | 0.22 | 3.23 | 5.86 | 100.00 |

*Pt calculated = 3.23 ppm* *Pt assay = 2.97 ppm* *Difference = 0.26 ppm*
Difference = 8%

| C3 | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 102.25 | 102.25 | 65.42 | 65.42 |
| *RC2* | 20.50 | 58.56 | 15.06 | 80.48 |
| *RC3-5* | 7.30 | 30.18 | 12.45 | 92.93 |
| *RT* | 0.31 | 3.81 | 7.07 | 100.00 |

*Pt calculated = 3.81 ppm* *Pt assay = 3.25 ppm* *Difference = 0.56 ppm*
*Difference = 15%*

| C4 | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 75.25 | 75.25 | 70.68 | 70.68 |
| *RC2* | 10.85 | 38.68 | 13.39 | 84.06 |
| *RC3-5* | 4.55 | 20.70 | 11.02 | 95.08 |
| *RT* | 0.19 | 3.21 | 4.92 | 100.00 |

*Pt calculated = 3.21 ppm* *Pt assay = 2.90 ppm* *Difference = 0.31 ppm*
*Difference = 10%*

| C5 | *Pt content ppm* | *Pt content cumulative ppm* | *Pt distribution %* | *Pt distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 113.50 | 113.50 | 70.55 | 70.55 |
| *RC2* | 18.60 | 60.37 | 14.71 | 85.26 |
| *RC3-5* | 5.30 | 27.61 | 10.99 | 96.25 |
| *RT* | 0.14 | 3.20 | 3.75 | 100.00 |

*Pt calculated = 3.20 ppm* *Pt assay = 3.06 ppm* *Difference = 0.14 ppm*
*Difference = 4%*

***Table 11*** *Kelsall flotation constants for platinum recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm assuming an ultimate recovery of 100 per cent.*

| Pt | $\phi$ | $K_f$ | $K_s$ | *Loss* |
|---|---|---|---|---|
| *A2* | 0.18 | 1.91 | 0.06 | 0.00 |
| *B2* | 0.14 | 2.44 | 0.07 | 0.00 |
| *A1* | 0.15 | 2.13 | 0.07 | 0.00 |
| *B1* | 0.21 | 2.27 | 0.05 | 0.00 |
| *A3* | 0.25 | 1.74 | 0.05 | 0.00 |
| *B3* | 0.17 | 1.74 | 0.06 | 0.00 |
| *A4* | 0.24 | 1.41 | 0.07 | 0.00 |
| *B4* | 0.26 | 1.68 | 0.08 | 0.00 |
| *A5* | 0.52 | 1.31 | 0.02 | 0.00 |
| *C1* | 0.25 | 1.68 | 0.05 | 0.00 |
| *C2* | 0.23 | 1.81 | 0.07 | 0.00 |
| *C3* | 0.23 | 1.78 | 0.06 | 0.00 |
| *C4* | 0.19 | 1.97 | 0.07 | 0.00 |
| *C5* | 0.18 | 1.88 | 0.08 | 0.00 |
| *Avg.* | 0.23 | 1.84 | 0.06 | 0.00 |

*Loss = (Observed – Predicted)* $^2$

***Table 12*** *Palladium recoveries from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| **A2** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 17.03 | 17.03 | 65.07 | 65.07 |
| *RC2* | 3.70 | 9.94 | 16.06 | 81.14 |
| *RC3-5* | 1.80 | 6.22 | 12.39 | 93.53 |
| *RT* | 0.05 | 0.69 | 6.47 | 100.00 |

*Pd calculated = 0.69 ppm Pd assay = 0.66 ppm Difference = 0.03 ppm*
*Difference = 6%*

| **B2** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 33.67 | 33.67 | 77.12 | 77.12 |
| *RC2* | 2.79 | 15.60 | 9.02 | 86.13 |
| *RC3-5* | 1.68 | 8.75 | 8.99 | 95.13 |
| *RT* | 0.07 | 1.16 | 4.87 | 100.00 |

*Pd calculated = 1.16 ppm Pd assay = 1.17 ppm Difference = 0.01 ppm*
*Difference = 0%*

| **A1** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 29.27 | 29.27 | 73.82 | 73.82 |
| *RC2* | 7.21 | 20.65 | 11.66 | 85.48 |
| *RC3-5* | 2.89 | 12.82 | 9.43 | 94.91 |
| *RT* | 0.09 | 1.49 | 5.09 | 100.00 |

*Pd calculated = 1.49 ppm Pd assay = 1.42 ppm Difference = 0.07 ppm*
*Difference = 5%*

| **B1** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 20.03 | 20.03 | 66.33 | 66.33 |
| *RC2* | 5.79 | 14.43 | 12.42 | 78.75 |
| *RC3-5* | 2.77 | 9.19 | 12.33 | 91.08 |
| *RT* | 0.11 | 1.10 | 8.92 | 100.00 |

*Pd calculated = 1.10 ppm Pd assay = 1.30 ppm Difference = 0.20 ppm*
*Difference = 15%*

| **A3** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 30.95 | 30.95 | 56.45 | 56.45 |
| *RC2* | 9.05 | 20.18 | 15.98 | 72.44 |
| *RC3-5* | 4.90 | 12.80 | 16.41 | 88.84 |
| *RT* | 0.21 | 1.64 | 11.16 | 100.00 |

*Pd calculated = 1.64 ppm Pd assay = 1.57 ppm Difference = 0.07 ppm*
*Difference = 5%*

***Table 12 cont.*** *Palladium recoveries from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| **B3** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 45.50 | 45.50 | 69.16 | 69.16 |
| *RC2* | 9.15 | 26.55 | 15.15 | 84.31 |
| *RC3-5* | 2.92 | 13.99 | 10.52 | 94.83 |
| *RT* | 0.09 | 1.56 | 5.17 | 100.00 |

*Pd calculated = 1.56 ppm Pd assay = 1.43 ppm Difference = 0.13 ppm*
Difference = 8%

| **A4** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 33.50 | 33.50 | 47.71 | 47.71 |
| *RC2* | 13.90 | 23.11 | 22.34 | 70.06 |
| *RC3-5* | 6.29 | 14.19 | 21.48 | 91.53 |
| *RT* | 0.15 | 1.59 | 8.47 | 100.00 |

*Pd calculated = 1.59 ppm Pd assay = 1.48 ppm Difference = 0.11 ppm*
*Difference = 7%*

| **B4** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 42.00 | 42.00 | 50.93 | 50.93 |
| *RC2* | 12.65 | 26.06 | 18.23 | 69.16 |
| *RC3-5* | 5.97 | 13.96 | 24.01 | 93.18 |
| *RT* | 0.15 | 1.92 | 6.82 | 100.00 |

*Pd calculated = 1. 92 ppm Pd assay = 1.87 ppm Difference = 0.05 ppm*
*Difference = 2%*

| **A5** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 26.00 | 26.00 | 37.06 | 37.06 |
| *RC2* | 9.15 | 17.44 | 13.46 | 50.52 |
| *RC3-5* | 5.05 | 10.98 | 15.89 | 66.41 |
| *RT* | 0.78 | 2.04 | 33.59 | 100.00 |

*Pd calculated = 2.04 ppm Pd assay = 2.05 ppm Difference = 0.01 ppm*
*Difference = 0%*

| **C1** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 31.00 | 31.00 | 63.71 | 63.71 |
| *RC2* | 5.35 | 16.99 | 13.24 | 76.95 |
| *RC3-5* | 2.12 | 8.59 | 12.42 | 89.37 |
| *RT* | 0.135 | 1.12 | 10.63 | 100.00 |

*Pd calculated = 1.12 ppm Pd assay = 1.04 ppm Difference = 0.08 ppm*
*Difference = 7%*

| **C2** | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 32.50 | 32.50 | 69.90 | 69.90 |
| *RC2* | 4.70 | 17.48 | 11.88 | 81.78 |
| *RC3-5* | 1.86 | 8.64 | 11.32 | 93.10 |
| *RT* | 0.105 | 1.31 | 6.90 | 100.00 |

*Pd calculated = 1.31 ppm Pd assay = 1.14 ppm Difference = 0.17 ppm*

*Difference = 13%*

| C3 | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 36.00 | 36.00 | 63.33 | 63.33 |
| *RC2* | 7.08 | 20.54 | 14.29 | 77.61 |
| *RC3-5* | 2.60 | 10.61 | 12.19 | 89.80 |
| *RT* | 0.16 | 1.38 | 10.20 | 100.00 |

*Pd calculated = 1.38 ppm* *Pd assay = 1.12 ppm* *Difference = 0.26 ppm*
*Difference = 19%*

***Table 12 cont.*** *Palladium recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm.*

| C4 | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 23.75 | 23.75 | 70.12 | 70.12 |
| *RC2* | 3.20 | 12.08 | 12.41 | 82.53 |
| *RC3-5* | 1.34 | 6.42 | 10.20 | 92.73 |
| *RT* | 0.09 | 1.02 | 7.27 | 100.00 |

*Pd calculated = 1.02 ppm Pd assay = 0.94 ppm Difference = 0.08 ppm*
*Difference = 8%*

| C5 | *Pd content ppm* | *Pd content cumulative ppm* | *Pd distribution %* | *Pd distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 47.50 | 47.50 | 71.01 | 71.01 |
| *RC2* | 6.65 | 24.63 | 12.65 | 83.66 |
| *RC3-5* | 2.17 | 11.27 | 10.80 | 94.46 |
| *RT* | 0.08 | 1.33 | 5.54 | 100.00 |

*Pd calculated = 1.33 ppm Pd assay = 1.31ppm Difference = 0.02 ppm*
*Difference = 2%*

***Table 13*** *Kelsall flotation constants for Pd recoveries from fourteen samples of UG2 chromitite milled to 80% <75μm assuming an ultimate recovery of 100%.*

| Pd | $\phi$ | $K_f$ | $K_s$ | *Loss* |
|---|---|---|---|---|
| *A2* | 0.22 | 1.71 | 0.06 | 0.00 |
| *B2* | 0.17 | 2.44 | 0.06 | 0.00 |
| *A1* | 0.17 | 2.11 | 0.06 | 0.00 |
| *B1* | 0.24 | 1.98 | 0.05 | 0.00 |
| *A3* | 0.31 | 1.65 | 0.05 | 0.00 |
| *B3* | 0.19 | 1.80 | 0.06 | 0.00 |
| *A4* | 0.35 | 1.19 | 0.07 | 0.00 |
| *B4* | 0.39 | 1.54 | 0.09 | 0.00 |
| *A5* | 0.52 | 1.38 | 0.02 | 0.00 |
| *C1* | 0.26 | 1.87 | 0.04 | 0.00 |
| *C2* | 0.21 | 2.07 | 0.06 | 0.00 |
| *C3* | 0.25 | 1.78 | 0.05 | 0.00 |
| *C4* | 0.20 | 2.01 | 0.05 | 0.00 |
| *C5* | 0.20 | 2.02 | 0.06 | 0.00 |
| *Avg.* | 0.26 | 1.84 | 0.06 | 0.00 |

*Loss = (Observed – Predicted)* $^2$

***Table 14*** *Rhodium recovery from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| **A2** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 10.78 | 10.78 | 71.89 | 71.89 |
| *RC2* | 2.03 | 6.13 | 15.38 | 87.28 |
| *RC3-5* | 1.04 | 3.80 | 12.50 | 99.77 |
| *RT* | 0.00 | 0.40 | 0.23 | 100.00 |

*Rh calculated = 0.40 ppm Rh assay = 0.35ppm Difference = 0.05 ppm*
*Difference = 13%*

| **B1** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 6.06 | 6.06 | 70.69 | 70.69 |
| *RC2* | 1.93 | 4.43 | 14.59 | 85.28 |
| *RC3-5* | 0.92 | 2.86 | 14.43 | 99.71 |
| *RT* | 0.00 | 0.31 | 0.29 | 100.00 |

*Rh calculated = 0.31 ppm Rh assay = 0.37 ppm Difference = 0.06 ppm*
*Difference = 16%*

| **A1** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 10.74 | 10.74 | 74.35 | 74.35 |
| *RC2* | 2.75 | 7.62 | 12.21 | 86.56 |
| *RC3-5* | 1.05 | 4.72 | 9.38 | 95.94 |
| *RT* | 0.02 | 0.54 | 4.06 | 100.00 |

*Rh calculated = 0.54 ppm Rh assay = 0.43 ppm Difference = 0.11 ppm*
*Difference = 26%*

| **B2** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 10.78 | 10.78 | 83.12 | 83.12 |
| *RC2* | 0.80 | 4.94 | 8.70 | 91.82 |
| *RC3-5* | 0.44 | 2.72 | 7.93 | 99.75 |
| *RT* | 0.00 | 0.35 | 0.25 | 100.00 |

*Rh calculated = 0.35 ppm Rh assay = 0.33 ppm Difference = 0.02 ppm*
*Difference = 5%*

| **A3** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 13.28 | 13.28 | 60.15 | 60.15 |
| *RC2* | 3.73 | 8.58 | 16.36 | 76.51 |
| *RC3-5* | 1.86 | 5.34 | 15.47 | 91.97 |
| *RT* | 0.06 | 0.66 | 8.03 | 100.00 |

*Rh calculated = 0.66 ppm Rh assay = 0.60 ppm Difference = 0.06 ppm*
*Difference = 11%*

***Table 14 cont.*** *Rhodium recovery from fourteen samples of UG2 chromitite milled to 80% <75µm.*

| **B3** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 15.70 | 15.70 | 68.14 | 68.14 |
| *RC2* | 3.50 | 9.34 | 16.55 | 84.69 |
| *RC3-5* | 1.01 | 4.91 | 10.39 | 95.08 |
| *RT* | 0.03 | 0.55 | 4.92 | 100.00 |

*Rh calculated = 0.55 ppm Rh assay = 0.43 ppm Difference = 0.12 ppm*
*Difference = 21%*

| **A4** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 11.90 | 11.90 | 47.34 | 47.34 |
| *RC2* | 5.40 | 8.45 | 24.24 | 71.58 |
| *RC3-5* | 2.52 | 5.31 | 24.00 | 95.59 |
| *RT* | 0.03 | 0.57 | 4.41 | 100.00 |

*Rh calculated = 0.57 ppm Rh assay = 0.46 ppm Difference = 0.11 ppm*
*Difference = 20%*

| **B4** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 12.25 | 12.25 | 49.54 | 49.54 |
| *RC2* | 3.95 | 7.74 | 18.99 | 68.53 |
| *RC3-5* | 1.95 | 4.25 | 26.16 | 94.69 |
| *RT* | 0.04 | 0.57 | 5.31 | 100.00 |

*Rh calculated = 0.57 ppm Rh assay = 0.53 ppm Difference = 0.04 ppm*
*Difference = 8%*

| **A5** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 5.10 | 5.10 | 26.67 | 26.67 |
| *RC2* | 2.60 | 3.83 | 14.03 | 40.69 |
| *RC3-5* | 2.13 | 2.94 | 24.55 | 65.25 |
| *RT* | 0.22 | 0.56 | 34.75 | 100.00 |

*Rh calculated = 0.56 ppm Rh assay = 0.52 ppm Difference = 0.04 ppm*
*Difference = 6%*

| **C1** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 11.45 | 11.45 | 49.52 | 49.52 |
| *RC2* | 3.50 | 7.11 | 18.22 | 67.74 |
| *RC3-5* | 1.61 | 4.00 | 19.84 | 87.58 |
| *RT* | 0.08 | 0.53 | 12.42 | 100.00 |

*Rh calculated = 0.53 ppm Rh assay = 0.45 ppm Difference = 0.08 ppm*
*Difference = 17%*

***Table 14 cont.*** *Rhodium recovery from fourteen samples of UG2 chromitite milled to 80% <75μm.*

| **C2** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 10.15 | 10.15 | 55.42 | 55.42 |
| *RC2* | 2.70 | 6.13 | 17.33 | 72.75 |
| *RC3-5* | 1.28 | 3.38 | 19.74 | 92.49 |
| *RT* | 0.05 | 0.51 | 7.51 | 100.00 |

*Rh calculated = 0.51 ppm Rh assay = 0.47 ppm Difference = 0.04 ppm*
*Difference = 9%*

| **C3** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 13.90 | 13.90 | 51.22 | 51.22 |
| *RC2* | 4.33 | 8.78 | 18.29 | 69.51 |
| *RC3-5* | 2.09 | 5.07 | 20.47 | 89.99 |
| *RT* | 0.08 | 0.66 | 10.01 | 100.00 |

*Rh calculated = 0.66 ppm Rh assay = 0.55 ppm Difference = 0.11 ppm*
*Difference = 17%*

| **C4** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 11.30 | 11.30 | 66.61 | 66.61 |
| *RC2* | 1.90 | 5.96 | 14.71 | 81.32 |
| *RC3-5* | 0.96 | 3.32 | 14.51 | 95.83 |
| *RT* | 0.03 | 0.51 | 4.17 | 100.00 |

*Rh calculated = 0.51 ppm Rh assay = 0.47 ppm Difference = 0.04 ppm*
*Difference = 8%*

| **C5** | *Rh content ppm* | *Rh content cumulative ppm* | *Rh distribution %* | *Rh distribution cumulative %* |
|---|---|---|---|---|
| *RC1* | 15.55 | 15.55 | 61.66 | 61.66 |
| *RC2* | 3.55 | 8.83 | 17.91 | 79.57 |
| *RC3-5* | 1.21 | 4.30 | 16.01 | 95.57 |
| *RT* | 0.03 | 0.50 | 4.43 | 100.00 |

*Rh calculated = 0.50 ppm Rh assay = 0.50 ppm Difference = 0.00 ppm*
*Difference = 1%*

***Table 15*** *Kelsall flotation constants for rhodium recovery from fourteen samples of UG2 chromitite milled to 80% <75μm assuming an ultimate recovery of 100%.*

| **Rh** | $\phi$ | $K_f$ | $K_s$ | *Loss* |
|---|---|---|---|---|
| *A2* | 0.30 | 2.13 | 0.25 | 0.00 |
| *B2* | 0.15 | 2.92 | 0.21 | 0.00 |
| *A1* | 0.21 | 2.24 | 0.25 | 0.00 |
| *B1* | 0.29 | 2.46 | 0.23 | 0.00 |
| *A3* | 0.29 | 1.63 | 0.06 | 0.00 |
| *B3* | 0.18 | 1.70 | 0.06 | 0.00 |
| *A4* | 0.36 | 1.16 | 0.11 | 0.00 |
| *B4* | 0.42 | 1.54 | 0.10 | 0.00 |
| *A5* | 0.64 | 1.15 | 0.03 | 0.00 |
| *C1* | 0.37 | 1.40 | 0.05 | 0.00 |
| *C2* | 0.33 | 1.59 | 0.07 | 0.00 |
| *C3* | 0.36 | 1.45 | 0.06 | 0.00 |
| *C4* | 0.24 | 1.89 | 0.09 | 0.00 |
| *C5* | 0.26 | 1.62 | 0.09 | 0.00 |
| *Avg.* | 0.31 | 1.78 | 0.12 | 0.00 |

*Loss = (Observed – Predicted)* $^2$

# APPENDIX K

*Multiple regression analysis results*

***Table 1a*** Observed and predicted values for $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 1b*** Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 2a*** Observed and predicted values for $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 2b*** Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio, and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 3a*** Observed and predicted values for $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 3b*** Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 4a*** Observed and predicted values for $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 4b*** Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio and the predicted PGE mineral degree of

liberation as independent variables, in turn excluding sample A5 and one other sample.

***Table 5*** Regression summary for dependent variable 100-U with sample A5 excluded.

***Table 6*** Regression summary for dependent variable $k_f$. All fourteen samples included.

***Table 7*** Regression summary for dependent variable $k_s$. All fourteen samples included.

***Table 8a*** Observed and predicted values for $R_s$ with % non-sulphide PGE mineral and the PGE mineral degree of liberation as independent variables as independent variables, in turn excluding one of the samples.

***Table 8b*** Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral and the PGE mineral degree of liberation as independent variables, in turn excluding one sample.

***Table 9a*** Observed and predicted values for $R_f$ with % non-sulphide PGE mineral PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite), and the PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.

***Table 9b*** Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite) to milling as independent variables, in turn excluding one sample.

***Table 10a*** Observed and predicted values for variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling, as independent variables, in turn excluding one of the samples.

***Table 10b*** Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling as independent variables, in turn excluding one sample.

***Table 11*** Regression summary for dependent variable 100-U excluding sample A5.

***Table 12*** Regression summary for dependent variable $k_f$. All fourteen samples included.

***Table 13*** Regression summary for dependent variable $k_s$. All fourteen samples included.

***Table 1a*** *Observed and predicted values for $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| Sample number | $R_f$ Observed | $R_f$ Predicted (n=14) | *$R_f$ Predicted (n=13) | $R_f$ Observed – *$R_f$ predicted |
|---|---|---|---|---|
| *A2* | 75.1 | 75.1 | 75.1 | 0.0 |
| *B2* | 80.3 | 79.3 | 79.0 | 1.4 |
| *A1* | 79.8 | 79.1 | 78.8 | 1.0 |
| *B1* | 73.8 | 76.3 | 77.7 | -3.8 |
| *A3* | 63.4 | 65.3 | 67.3 | -3.9 |
| *B3* | 74.4 | 71.9 | 70.9 | 3.5 |
| *A4* | 59.9 | 61.2 | 62.6 | -2.7 |
| *B4* | 56.5 | 55.3 | 53.0 | 3.5 |
| *A5* | 39.7 | 39.3 | 37.2 | 2.5 |
| *C1* | 66.3 | 69.3 | 70.1 | -3.8 |
| *C2* | 71.5 | 69.8 | 69.4 | 2.1 |
| *C3* | 68.2 | 68.8 | 68.4 | -0.2 |
| *C4* | 74.8 | 72.3 | 71.6 | 3.2 |
| *C5* | 74.8 | 75.6 | 75.8 | -1.0 |

**R_f predicted :* *Value of $R_f$ determined from the regression equation calculated from the other 13 samples.*

***Table 1b*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A2 excluded** |
|---|---|---|---|---|
| R= .98881140 $R^2$= .97774799 Adjusted $R^2$= .96662199 | | | | |
| F(4,8)=87.880 p<.00000 Std.Error of estimate: 2.0388 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 61.67 | 7.23 | 8.53 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -7.04 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.18 | 2.15 | -3.34 | 0.01 |
| *pn/(pn+mil)* | -22.32 | 3.20 | -6.97 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.07 | 10.03 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B2 excluded** |
| R= .98827751 $R^2$= .97669244 Adjusted $R^2$= .96503866 | | | | |
| F(4,8)=83.809 p<.00000 Std.Error of estimate: 2.0123 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 61.16 | 7.08 | 8.63 | 0.00 |
| *% non sulphide PGEM* | -0.21 | 0.03 | -6.93 | 0.00 |
| *PGEM grain diameter at <2mm* | -6.95 | 2.12 | -3.27 | 0.01 |
| *pn/(pn+mil)* | -22.25 | 3.03 | -7.35 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.07 | 10.01 | 0.00 |

***Table 1b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A1 excluded** |
|---|---|---|---|---|
| R= .98811817 $R^2$= .97637751 Adjusted $R^2$= .96456626 | | | | |
| F(4,8)=82.665 p<.00000 Std.Error of estimate: 2.0356 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 61.94 | 7.33 | 8.45 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -7.18 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.23 | 2.11 | -3.42 | 0.01 |
| *pn/(pn+mil)* | -22.30 | 3.06 | -7.29 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.07 | 9.63 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B1 excluded** |
| R= .99190668 $R^2$= .98387886 Adjusted $R^2$= .97581830 | | | | |
| F(4,8)=122.06 p<.00000 Std.Error of estimate: 1.7447 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 65.46 | 6.47 | 10.12 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -8.55 | 0.00 |
| *PGEM grain diameter at <2mm* | -8.85 | 2.04 | -4.34 | 0.00 |
| *pn/(pn+mil)* | -23.42 | 2.70 | -8.66 | 0.00 |
| *PGEM pred. degree of liberation* | 0.70 | 0.06 | 11.81 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A3 excluded** |
| R= .99126096 $R^2$= .98259828 Adjusted $R^2$= .97389742 | | | | |
| F(4,8)=112.93 p<.00000 Std.Error of estimate: 1.8146 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 58.94 | 6.59 | 8.95 | 0.00 |
| *% non sulphide PGEM* | -0.23 | 0.03 | -8.14 | 0.00 |
| *PGEM grain diameter at <2mm* | -5.56 | 2.17 | -2.57 | 0.03 |
| *pn/(pn+mil)* | -19.04 | 3.54 | -5.38 | 0.00 |
| *PGEM pred. degree of liberation* | 0.64 | 0.07 | 9.50 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B3 excluded** |
| R= .99284297 $R^2$= .98573717 Adjusted $R^2$= .97860575 | | | | |
| F(4,8)=138.22 p<.00000 Std.Error of estimate: 1.6374 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 56.61 | 6.19 | 9.15 | 0.00 |
| *% non sulphide PGEM* | -0.20 | 0.03 | -7.59 | 0.00 |
| *PGEM grain diameter at <2mm* | -5.72 | 1.82 | -3.15 | 0.01 |
| *pn/(pn+mil)* | -22.96 | 2.48 | -9.25 | 0.00 |
| *PGEM pred. degree of liberation* | 0.70 | 0.06 | 12.66 | 0.00 |

***Table 1b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** **A4 excluded**<br>R= .98942983 $R^2$= .97897140 Adjusted $R^2$= .96845709<br>F(4,8)=93.109 p<.00000 Std.Error of estimate: 1.9610 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 60.96 | 6.88 | 8.86 | 0.00 |
| *% non sulphide PGEM* | -0.20 | 0.04 | -5.49 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.46 | 2.04 | -3.65 | 0.01 |
| *pn/(pn+mil)* | -23.73 | 3.44 | -6.90 | 0.00 |
| *PGEM pred. degree of liberation* | 0.71 | 0.08 | 9.41 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** **B4 excluded**<br>R= .99023976 $R^2$= .98057479 Adjusted $R^2$= .97086218<br>F(4,8)=100.96 p<.00000 Std.Error of estimate: 1.8356 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 70.81 | 9.26 | 7.65 | 0.00 |
| *% non sulphide PGEM* | -0.26 | 0.04 | -6.20 | 0.00 |
| *PGEM grain diameter at <2mm* | -9.64 | 2.61 | -3.70 | 0.01 |
| *pn/(pn+mil)* | -21.92 | 2.77 | -7.90 | 0.00 |
| *PGEM pred. degree of liberation* | 0.64 | 0.07 | 9.50 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** **A5 excluded**<br>R= .97404853 $R^2$= .94877054 Adjusted $R^2$= .92315580<br>F(4,8)=37.040 p<.00003 Std.Error of estimate: 2.0382 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 61.07 | 11.24 | 5.44 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -6.81 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.10 | 2.35 | -3.02 | 0.02 |
| *pn/(pn+mil)* | -22.55 | 4.84 | -4.66 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.14 | 4.96 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** **C1 excluded**<br>R= .99065733 $R^2$= .98140195 Adjusted $R^2$= .97210293<br>F(4,8)=105.54 p<.00000 Std.Error of estimate: 1.8900 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 61.61 | 6.58 | 9.37 | 0.00 |
| *% non sulphide PGEM* | -0.21 | 0.03 | -7.62 | 0.00 |
| *PGEM grain diameter at <2mm* | -6.93 | 1.95 | -3.56 | 0.01 |
| *pn/(pn+mil)* | -22.71 | 2.86 | -7.93 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.06 | 10.77 | 0.00 |

***Table 1b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

**Regression Summary for Dependent Variable: $R_f$** **C2 excluded**
R= .98953456 $R^2$= .97917865 Adjusted $R^2$= .96876798
F(4,8)=94.055 p<.00000 Std.Error of estimate: 1.9967

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 61.25 | 6.98 | 8.77 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -7.30 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.17 | 2.05 | -3.51 | 0.01 |
| *pn/(pn+mil)* | -22.07 | 3.03 | -7.29 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.07 | 10.26 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **C3 excluded**
R= .98937372 $R^2$= .97886036 Adjusted $R^2$= .96829054
F(4,8)=92.609 p<.00000 Std.Error of estimate: 2.0182

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 61.87 | 7.05 | 8.78 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -7.25 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.14 | 2.07 | -3.45 | 0.01 |
| *pn/(pn+mil)* | -22.33 | 3.04 | -7.36 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.07 | 10.02 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **C4 excluded**
R= .99114362 $R^2$= .98236568 Adjusted $R^2$= .97354851
F(4,8)=111.42 p<.00000 Std.Error of estimate: 1.8170

| | B | St. Err. of B | t(8) | p-level |
|---|---|---|---|---|
| *Intercept* | 61.31 | 6.33 | 9.69 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -8.09 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.21 | 1.86 | -3.87 | 0.00 |
| *pn/(pn+mil)* | -21.43 | 2.80 | -7.66 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.06 | 11.15 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **C5 excluded**
R= .98922510 $R^2$= .97856629 Adjusted $R^2$= .96784943
F(4,8)=91.311 p<.00000 Std.Error of estimate: 2.0037

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 62.18 | 7.05 | 8.83 | 0.00 |
| *% non sulphide PGEM* | -0.22 | 0.03 | -7.30 | 0.00 |
| *PGEM grain diameter at <2mm* | -7.35 | 2.08 | -3.53 | 0.01 |
| *pn/(pn+mil)* | -22.80 | 3.16 | -7.23 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.07 | 10.18 | 0.00 |

***Table 2a*** *Observed and predicted values for $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| Sample number | $R_f$ Observed | $R_f$ Predicted (n=14) | *$R_f$ Predicted (n=13) | $R_f$ Observed – *$R_f$ predicted |
|---|---|---|---|---|
| *A2* | 75.1 | 76.5 | 76.9 | -1.8 |
| *B2* | 80.3 | 77.7 | 77.0 | 3.3 |
| *A1* | 79.8 | 80.2 | 80.3 | -0.5 |
| *B1* | 73.8 | 73.0 | 72.9 | 0.9 |
| *A3* | 63.4 | 68.3 | 70.9 | -7.5 |
| *B3* | 74.4 | 69.1 | 68.2 | 6.2 |
| *A4* | 59.9 | 60.5 | 61.1 | -1.2 |
| *B4* | 56.5 | 59.6 | 41.7 | 14.8 |
| *A5* | 39.7 | 37.8 | 30.4 | 9.3 |
| *C1* | 66.3 | 69.7 | 70.7 | -4.4 |
| *C2* | 71.5 | 70.0 | 69.6 | 1.9 |
| *C3* | 68.2 | 69.1 | 69.3 | -1.1 |
| *C4* | 74.8 | 72.5 | 71.8 | 3.1 |
| *C5* | 74.8 | 74.6 | 68.5 | 6.3 |

**$R_f$* predicted :** *Value of $R_f$ determined from the regression equation calculated from the other 13 samples.*

***Table 2b*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio, and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A2 excluded** |
|---|---|---|---|---|
| R= .97297118 $R^2$= .94667292 Adjusted $R^2$= .92889723 | | | | |
| F(3,9)=53.257 p<.00000 Std.Error of estimate: 2.9756 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 40.24 | 4.87 | 8.26 | 0.00 |
| *% non sulphide PGEM* | -0.18 | 0.04 | -4.26 | 0.00 |
| *pn/(pn+mil)* | -18.63 | 4.38 | -4.25 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 6.98 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B2 excluded** |
| R= .97234955 $R^2$= .94546365 Adjusted $R^2$= .92728486 | | | | |
| F(3,9)=52.009 p<.00001 Std.Error of estimate: 2.9020 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 40.67 | 4.78 | 8.50 | 0.00 |
| *% non sulphide PGEM* | -0.16 | 0.04 | -4.24 | 0.00 |
| *pn/(pn+mil)* | -19.28 | 4.17 | -4.63 | 0.00 |
| *PGEM pred. degree of liberation* | 0.68 | 0.10 | 6.99 | 0.00 |

***Table 2b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio, and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A1 excluded** |
|---|---|---|---|---|
| R= .97048122 $R^2$= .94183380 Adjusted $R^2$= .92244507 | | | | |
| F(3,9)=48.576 p<.00001 Std.Error of estimate: 3.0116 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 39.81 | 5.09 | 7.82 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.27 | 0.00 |
| *pn/(pn+mil)* | -19.22 | 4.33 | -4.44 | 0.00 |
| *PGEM pred. degree of liberation* | 0.70 | 0.10 | 6.75 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B1 excluded** |
| R= .97258564 $R^2$= .94592283 Adjusted $R^2$= .92789710 | | | | |
| F(3,9)=52.476 p<.00001 Std.Error of estimate: 3.0127 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 40.41 | 5.04 | 8.01 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.27 | 0.00 |
| *pn/(pn+mil)* | -19.08 | 4.34 | -4.40 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 6.70 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A3 excluded** |
| R= .98400607 $R^2$= .96826795 Adjusted $R^2$= .95769060 | | | | |
| F(3,9)=91.542 p<.00000 Std.Error of estimate: 2.3103 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 44.19 | 4.10 | 10.77 | 0.00 |
| *% non sulphide PGEM* | -0.21 | 0.03 | -6.09 | 0.00 |
| *pn/(pn+mil)* | -14.28 | 3.84 | -3.72 | 0.00 |
| *PGEM pred. degree of liberation* | 0.61 | 0.08 | 7.22 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B3 excluded** |
| R= .97337194 $R^2$= .94745294 Adjusted $R^2$= .92993725 | | | | |
| F(3,9)=54.092 p<.00000 Std.Error of estimate: 3.0000 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 40.59 | 5.05 | 8.03 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.30 | 0.00 |
| *pn/(pn+mil)* | -19.23 | 4.31 | -4.46 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 6.86 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A4 excluded** |
| R= .97571419 $R^2$= .95201819 Adjusted $R^2$= .93602425 | | | | |
| F(3,9)=59.524 p<.00000 Std.Error of estimate: 2.8621 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 41.08 | 4.77 | 8.61 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.45 | 0.00 |
| *pn/(pn+mil)* | -19.85 | 4.16 | -4.77 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 7.23 | 0.00 |

***Table 2b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio, and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **B4 excluded** |
|---|---|---|---|---|
| R= .97435099 $R^2$= .94935986 Adjusted $R^2$= .93247981 | | | | |
| F(3,9)=56.242 p<.00000 Std.Error of estimate: 2.9029 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 39.72 | 4.77 | 8.32 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.45 | 0.00 |
| *pn/(pn+mil)* | -18.31 | 4.28 | -4.28 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 7.12 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A5 excluded** |
| R= .97323841 $R^2$= .94719300 Adjusted $R^2$= .92959067 | | | | |
| F(3,9)=53.811 p<.00000 Std.Error of estimate: 2.9980 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 39.75 | 5.01 | 7.94 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.27 | 0.00 |
| *pn/(pn+mil)* | -18.94 | 4.34 | -4.36 | 0.00 |
| *PGEM pred. degree of liberation* | 0.70 | 0.10 | 6.96 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C1 excluded** |
| R= .97217230 $R^2$= .94511898 Adjusted $R^2$= .92682530 | | | | |
| F(3,9)=51.664 p<.00001 Std.Error of estimate: 3.0229 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 40.14 | 4.94 | 8.12 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.24 | 0.00 |
| *pn/(pn+mil)* | -19.14 | 4.50 | -4.26 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 6.82 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C2 excluded** |
| R= .97152886 $R^2$= .94386833 Adjusted $R^2$= .92515777 | | | | |
| F(3,9)=50.446 p<.00001 Std.Error of estimate: 3.0206 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 39.80 | 5.72 | 6.96 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.05 | -3.06 | 0.01 |
| *pn/(pn+mil)* | -19.46 | 4.98 | -3.90 | 0.00 |
| *PGEM pred. degree of liberation* | 0.70 | 0.12 | 6.01 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C3 excluded** |
| R= .97337194 $R^2$= .94745294 Adjusted $R^2$= .92993725 | | | | |
| F(3,9)=54.092 p<.00000 Std.Error of estimate: 3.0000 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 40.59 | 5.05 | 8.03 | 0.00 |
| *% non sulphide PGEM* | -0.17 | 0.04 | -4.30 | 0.00 |
| *pn/(pn+mil)* | -19.23 | 4.31 | -4.46 | 0.00 |
| *PGEM pred. degree of liberation* | 0.69 | 0.10 | 6.86 | 0.00 |

***Table 2b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio, and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_f$** **C4 excluded**<br>R= .98387705 $R^2$= .96801404 Adjusted $R^2$= .95735206<br>F(3,9)=90.791 p<.00000 Std.Error of estimate: 2.3118 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 39.06 | 3.81 | 10.26 | 0.00 |
| *% non sulphide PGEM* | -0.15 | 0.03 | -4.95 | 0.00 |
| *pn/(pn+mil)* | -21.20 | 3.41 | -6.21 | 0.00 |
| *PGEM pred. degree of liberation* | 0.72 | 0.08 | 9.26 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** **C5 excluded**<br>R= .97333239 $R^2$= .94737593 Adjusted $R^2$= .92983458<br>F(3,9)=54.008 p<.00000 Std.Error of estimate: 2.8485 | | | | |
| | *B* | *St. Err. of B* | *t(9)* | *p-level* |
| *Intercept* | 38.61 | 4.88 | 7.92 | 0.00 |
| *% non sulphide PGEM* | -0.15 | 0.04 | -3.32 | 0.01 |
| *pn/(pn+mil)* | -20.44 | 4.26 | -4.80 | 0.00 |
| *PGEM pred. degree of liberation* | 0.72 | 0.10 | 7.31 | 0.00 |

***Table 3a*** *Observed and predicted values for $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Sample number** | **$R_s$ Observed** | **$R_s$ Predicted (n=14)** | ***$R_s$ Predicted (n=13)** | **$R_s$ Observed – *$R_s$predicted** |
|---|---|---|---|---|
| *A2* | 18.8 | 18.0 | 17.7 | 1.1 |
| *B2* | 15.3 | 15.9 | 16.1 | -0.8 |
| *A1* | 16.3 | 17.7 | 18.5 | -2.2 |
| *B1* | 19.6 | 18.7 | 18.3 | 1.4 |
| *A3* | 25.9 | 25.5 | 24.9 | 1.0 |
| *B3* | 21.0 | 21.1 | 21.1 | -0.1 |
| *A4* | 33.7 | 33.7 | 33.7 | 0.0 |
| *B4* | 37.7 | 37.5 | 37.2 | 0.5 |
| *A5* | 28.7 | 29.0 | 37.1 | -8.4 |
| *C1* | 24.5 | 24.9 | 25.1 | -0.6 |
| *C2* | 22.6 | 23.4 | 19.5 | 3.0 |
| *C3* | 24.0 | 23.8 | 23.7 | 0.3 |
| *C4* | 19.9 | 18.8 | 17.8 | 2.1 |
| *C5* | 21.1 | 21.1 | 21.1 | 0.0 |

**$R_s$ predicted : Value of $R_s$ determined from the regression equation calculated for the other 13 samples.*

***Table 3b*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_s$** **A2 excluded**<br>R= .99492020 $R^2$= .98986621 Adjusted $R^2$= .98262778<br>F(5,7)=136.75 p<.00000 Std.Error of estimate: .84867 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.26 | 3.02 | -1.74 | 0.13 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 9.90 | 0.00 |
| *PGEM grain diameter at <2mm* | 5.85 | 1.03 | 5.68 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 8.02 | 0.00 |
| *pn/(pn+mil)* | 4.86 | 1.45 | 3.35 | 0.01 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -5.34 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **B2 excluded**<br>R= .99425144 $R^2$= .98853592 Adjusted $R^2$= .98034730<br>F(5,7)=120.72 p<.00000 Std.Error of estimate: .85769 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.46 | 3.02 | -1.81 | 0.11 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 9.77 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.03 | 0.99 | 6.07 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 7.74 | 0.00 |
| *pn/(pn+mil)* | 4.91 | 1.46 | 3.36 | 0.01 |
| *PGEM pred. degree of liberation* | -0.19 | 0.04 | -4.94 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **A1 excluded**<br>R= .99669983 $R^2$= .99341055 Adjusted $R^2$= .98870380<br>F(5,7)=211.06 p<.00000 Std.Error of estimate: .66260 | | | | |
| | B | St. Err. of B | t(7) | p-level |
| *Intercept* | -7.44 | 2.42 | -3.08 | 0.02 |
| *% non sulphide PGEM* | 0.18 | 0.01 | 12.87 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.76 | 0.81 | 8.36 | 0.00 |
| *Chromite grain diameter* | 0.10 | 0.01 | 8.48 | 0.00 |
| *pn/(pn+mil)* | 4.49 | 1.14 | 3.92 | 0.01 |
| *PGEM pred. degree of liberation* | -0.16 | 0.03 | -4.88 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **B1 excluded**<br>R= .99556347 $R^2$= .99114663 Adjusted $R^2$= .98482279<br>F(5,7)=156.73 p<.00000 Std.Error of estimate: .79951 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -7.06 | 2.97 | -2.38 | 0.05 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 10.62 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.70 | 1.03 | 6.53 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 8.56 | 0.00 |
| *pn/(pn+mil)* | 5.40 | 1.38 | 3.91 | 0.01 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -5.73 | 0.00 |

***Table 3b continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **A3 excluded** |
|---|---|---|---|---|
| R= .99542266 $R^2$= .99086628 Adjusted $R^2$= .98434219 | | | | |
| F(5,7)=151.88 p<.00000 Std.Error of estimate: .82015 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -4.77 | 3.00 | -1.59 | 0.16 |
| *% non sulphide PGEM* | 0.18 | 0.02 | 9.14 | 0.00 |
| *PGEM grain diameter at <2mm* | 5.76 | 1.00 | 5.78 | 0.00 |
| *Chromite grain diameter* | 0.10 | 0.02 | 6.56 | 0.00 |
| *pn/(pn+mil)* | 3.32 | 2.11 | 1.57 | 0.16 |
| *PGEM pred. degree of liberation* | -0.16 | 0.05 | -3.50 | 0.01 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **B3 excluded** |
| R= .99470937 $R^2$= .98944674 Adjusted $R^2$= .98190870 | | | | |
| F(5,7)=131.26 p<.00000 Std.Error of estimate: .88096 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.31 | 3.46 | -1.53 | 0.17 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 7.54 | 0.00 |
| *PGEM grain diameter at <2mm* | 5.91 | 1.24 | 4.79 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.02 | 6.83 | 0.00 |
| *pn/(pn+mil)* | 5.21 | 1.61 | 3.24 | 0.01 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -4.62 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **A4 excluded** |
| R= .99329542 $R^2$= .98663580 Adjusted $R^2$= .97708994 | | | | |
| F(5,7)=103.36 p<.00000 Std.Error of estimate: .88413 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.70 | 3.10 | -1.84 | 0.11 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 8.88 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.17 | 1.06 | 5.83 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 7.40 | 0.00 |
| *pn/(pn+mil)* | 5.15 | 1.62 | 3.17 | 0.02 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -4.94 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **B4 excluded** |
| R= .99102283 $R^2$= .98212625 Adjusted $R^2$= .96935928 | | | | |
| F(5,7)=76.927 p<.00001 Std.Error of estimate: .88276 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.01 | 4.45 | -1.13 | 0.30 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 7.17 | 0.00 |
| *PGEM grain diameter at <2mm* | 5.92 | 1.32 | 4.47 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 7.77 | 0.00 |
| *pn/(pn+mil)* | 5.06 | 1.50 | 3.38 | 0.01 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -4.89 | 0.00 |

***Table 3b continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **A5 excluded** |
|---|---|---|---|---|
| R= .99684844 $R^2$= .99370681 Adjusted $R^2$= .98921168 | | | | |
| F(5,7)=221.06 p<.00000 Std.Error of estimate: .66522 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 7.10 | 5.99 | 1.19 | 0.27 |
| *% non sulphide PGEM* | 0.19 | 0.02 | 11.67 | 0.00 |
| *PGEM grain diameter at <2mm* | 5.86 | 0.77 | 7.59 | 0.00 |
| *Chromite grain diameter* | 0.07 | 0.02 | 3.13 | 0.02 |
| *pn/(pn+mil)* | 8.66 | 1.92 | 4.51 | 0.00 |
| *PGEM pred. degree of liberation* | -0.30 | 0.05 | -5.60 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C1 excluded** |
| R= .99615900 $R^2$= .99233275 Adjusted $R^2$= .98685614 | | | | |
| F(5,7)=181.19 p<.00000 Std.Error of estimate: .75508 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.74 | 2.63 | -2.18 | 0.07 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 10.96 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.12 | 0.87 | 7.05 | 0.00 |
| *Chromite grain diameter* | 0.12 | 0.01 | 9.23 | 0.00 |
| *pn/(pn+mil)* | 5.01 | 1.28 | 3.93 | 0.01 |
| *PGEM pred. degree of liberation* | -0.21 | 0.03 | -6.13 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C2 excluded** |
| R= .99488254 $R^2$= .98979127 Adjusted $R^2$= .98249931 | | | | |
| F(5,7)=135.74 p<.00000 Std.Error of estimate: .87141 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.61 | 3.05 | -1.84 | 0.11 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 9.58 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.09 | 1.00 | 6.08 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 7.89 | 0.00 |
| *pn/(pn+mil)* | 4.99 | 1.48 | 3.38 | 0.01 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -5.16 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C3 excluded** |
| R= .99487254 $R^2$= .98977136 Adjusted $R^2$= .98246520 | | | | |
| F(5,7)=135.47 p<.00000 Std.Error of estimate: .87287 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.89 | 3.05 | -1.93 | 0.10 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 9.61 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.14 | 1.00 | 6.12 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 7.68 | 0.00 |
| *pn/(pn+mil)* | 5.00 | 1.48 | 3.38 | 0.01 |
| *PGEM pred. degree of liberation* | -0.19 | 0.04 | -4.94 | 0.00 |

***Table 3b continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **C4 excluded** |
|---|---|---|---|---|
| R= .99630132 $R^2$=.99261631 Adjusted $R^2$= .98734225 | | | | |
| F(5,7)=188.21 p<.00000 Std.Error of estimate: .73171 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.83 | 2.55 | -2.29 | 0.06 |
| *% non sulphide PGEM* | 0.16 | 0.02 | 9.60 | 0.00 |
| *PGEM grain diameter at <2mm* | 5.65 | 0.88 | 6.42 | 0.00 |
| *Chromite grain diameter* | 0.13 | 0.01 | 8.83 | 0.00 |
| *pn/(pn+mil)* | 6.24 | 1.41 | 4.44 | 0.00 |
| *PGEM pred. degree of liberation* | -0.23 | 0.04 | -6.30 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C5 excluded** |
| R= .99469230 $R^2$= .98941278 Adjusted $R^2$= .98185048 | | | | |
| F(5,7)=130.83 p<.00000 Std.Error of estimate: .88288 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | -5.87 | 3.11 | -1.89 | 0.10 |
| *% non sulphide PGEM* | 0.17 | 0.02 | 9.54 | 0.00 |
| *PGEM grain diameter at <2mm* | 6.16 | 1.03 | 5.98 | 0.00 |
| *Chromite grain diameter* | 0.11 | 0.01 | 7.73 | 0.00 |
| *pn/(pn+mil)* | 5.12 | 1.53 | 3.34 | 0.01 |
| *PGEM pred. degree of liberation* | -0.20 | 0.04 | -5.08 | 0.00 |

***Table 4a*** *Observed and predicted values for $R_s$ with % non-sulphide PGE mineral, PGE mineral grain diameter prior to milling, pn/(pn+mil) ratio, median chromite grain diameter and the predicted PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Sample number** | **$R_s$ Observed** | **$R_s$ Predicted (n=14)** | ***$R_s$ Predicted (n=13)** | **$R_s$ Observed – *$R_s$ predicted** |
|---|---|---|---|---|
| *A2* | 18.8 | 17.3 | 16.8 | 2.0 |
| *B2* | 19.6 | 21.5 | 21.9 | -2.3 |
| *A1* | 16.3 | 14.5 | 13.2 | 3.1 |
| *B1* | 15.3 | 16.6 | 17.0 | -1.7 |
| *A3* | 25.9 | 24.4 | 24.0 | 1.9 |
| *B3* | 21.0 | 24.4 | 25.4 | -4.4 |
| *A4* | 33.7 | 34.7 | 35.9 | -2.2 |
| *B4* | 37.7 | 35.1 | 33.1 | 4.6 |
| *C1* | 24.5 | 23.6 | 23.3 | 1.3 |
| *C2* | 22.6 | 23.5 | 23.7 | -1.1 |
| *C3* | 24.0 | 24.1 | 24.2 | -0.2 |
| *C4* | 19.9 | 21.3 | 21.7 | -1.8 |
| *C5* | 21.1 | 19.4 | 18.8 | 2.3 |

**$R_s$ predicted : Value of $R_s$ determined from the regression equation calculated for the other 13 samples.*

***Table 4b*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding sample A5 and one other sample.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **A2 excluded** |
|---|---|---|---|---|
| R= .96436815 $R^2$= .93000593 Adjusted $R^2$= .90375816 | | | | |
| F(3,8)=35.432 p<.00006 Std.Error of estimate: 2.0319 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 46.80 | 5.87 | 7.98 | 0.00 |
| *% non sulphide PGEM* | 0.20 | 0.03 | 6.95 | 0.00 |
| *pn/(pn+mil)* | 14.04 | 4.76 | 2.95 | 0.02 |
| *PGEM pred. degree of liberation* | -0.55 | 0.13 | -4.41 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **B2 excluded** |
| R= .95989945 $R^2$= .92140695 Adjusted $R^2$= .89193455 | | | | |
| F(3,8)=31.263 p<.00009 Std.Error of estimate: 2.0464 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 45.58 | 6.17 | 7.39 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 6.86 | 0.00 |
| *pn/(pn+mil)* | 13.82 | 4.86 | 2.85 | 0.02 |
| *PGEM pred. degree of liberation* | -0.53 | 0.13 | -3.98 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **A1 excluded** |
| R= .96571593 $R^2$= .93260726 Adjusted $R^2$= .90733498 | | | | |
| F(3,8)=36.902 p<.00005 Std.Error of estimate: 1.9311 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 50.79 | 6.49 | 7.82 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 7.50 | 0.00 |
| *pn/(pn+mil)* | 16.89 | 4.93 | 3.43 | 0.01 |
| *PGEM pred. degree of liberation* | -0.64 | 0.14 | -4.59 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **B1 excluded** |
| R= .96697151 $R^2$= .93503391 Adjusted $R^2$= .91067162 | | | | |
| F(3,8)=38.380 p<.00004 Std.Error of estimate: 1.9725 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 45.29 | 5.86 | 7.73 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 7.34 | 0.00 |
| *pn/(pn+mil)* | 13.66 | 4.66 | 2.93 | 0.02 |
| *PGEM pred. degree of liberation* | -0.52 | 0.13 | -4.16 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **A3 excluded** |
| R= .96985665 $R^2$= .94062193 Adjusted $R^2$= .91835515 | | | | |
| F(3,8)=42.243 p<.00003 Std.Error of estimate: 1.8949 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 39.31 | 7.74 | 5.08 | 0.00 |
| *% non sulphide PGEM* | 0.22 | 0.03 | 6.81 | 0.00 |
| *pn/(pn+mil)* | 7.69 | 6.64 | 1.16 | 0.28 |
| *PGEM pred. degree of liberation* | -0.39 | 0.17 | -2.34 | 0.05 |

***Table 4b continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding sample A5 and one other sample.*

**Regression Summary for Dependent Variable: $R_s$** **B3 excluded**
R= .97878183 $R^2$= .95801388 Adjusted $R^2$= .94226909
F(3,8)=60.846 p<.00001 Std.Error of estimate: 1.5993

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 50.45 | 4.87 | 10.37 | 0.00 |
| *% non sulphide PGEM* | 0.18 | 0.02 | 8.18 | 0.00 |
| *pn/(pn+mil)* | 18.12 | 4.03 | 4.50 | 0.00 |
| *PGEM pred. degree of liberation* | -0.63 | 0.10 | -6.07 | 0.00 |

**Regression Summary for Dependent Variable: $R_s$** **A4 excluded**
R= .95388385 $R^2$= .90989441 Adjusted $R^2$= .87610481
F(3,8)=26.928 p<.00016 Std.Error of estimate: 2.0422

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 45.98 | 6.00 | 7.67 | 0.00 |
| *% non sulphide PGEM* | 0.21 | 0.04 | 5.66 | 0.00 |
| *pn/(pn+mil)* | 13.74 | 4.86 | 2.82 | 0.02 |
| *PGEM pred. degree of liberation* | -0.54 | 0.13 | -4.20 | 0.00 |

**Regression Summary for Dependent Variable: $R_s$** **B4 excluded**
R= .95113706 $R^2$= .90466172 Adjusted $R^2$= .86890986
F(3,8)=25.304 p<.00020 Std.Error of estimate: 1.7668

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 45.39 | 5.16 | 8.80 | 0.00 |
| *% non sulphide PGEM* | 0.16 | 0.03 | 5.98 | 0.00 |
| *pn/(pn+mil)* | 13.49 | 4.15 | 3.25 | 0.01 |
| *PGEM pred. degree of liberation* | -0.52 | 0.11 | -4.69 | 0.00 |

**Regression Summary for Dependent Variable: $R_s$** **C1 excluded**
R= .96326816 $R^2$= .92788555 Adjusted $R^2$= .90084263
F(3,8)=34.312 p<.00006 Std.Error of estimate: 2.1017

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 46.67 | 6.20 | 7.52 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 6.83 | 0.00 |
| *pn/(pn+mil)* | 14.44 | 4.90 | 2.95 | 0.02 |
| *PGEM pred. degree of liberation* | -0.55 | 0.13 | -4.21 | 0.00 |

**Regression Summary for Dependent Variable: $R_s$** **C2 excluded**
R= .96354958 $R^2$= .92842780 Adjusted $R^2$= .90158823
F(3,8)=34.592 p<.00006 Std.Error of estimate: 2.0978

| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 46.94 | 6.15 | 7.63 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 6.83 | 0.00 |
| *pn/(pn+mil)* | 14.41 | 4.89 | 2.95 | 0.02 |
| *PGEM pred. degree of liberation* | -0.55 | 0.13 | -4.26 | 0.00 |

***Table 4b continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, pn/(pn+mil) ratio and the predicted PGE mineral degree of liberation as independent variables, in turn excluding sample A5 and one other sample.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **C3 excluded** |
|---|---|---|---|---|
| R= .96336193 $R^2$= .92806621 Adjusted $R^2$= .90109103 | | | | |
| F(3,8)=34.404 p<.00006 Std.Error of estimate: 2.1021 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 46.70 | 6.33 | 7.37 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 6.80 | 0.00 |
| *pn/(pn+mil)* | 14.42 | 4.93 | 2.92 | 0.02 |
| *PGEM pred. degree of liberation* | -0.55 | 0.13 | -4.14 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C4 excluded** |
| R= .96478014 $R^2$=.93080071 Adjusted $R^2$= .90485098 | | | | |
| F(3,8)=35.869 p<.00005 Std.Error of estimate: 2.0399 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 46.61 | 5.89 | 7.91 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 7.06 | 0.00 |
| *pn/(pn+mil)* | 13.65 | 4.88 | 2.80 | 0.02 |
| *PGEM pred. degree of liberation* | -0.54 | 0.13 | -4.26 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C5 excluded** |
| R= .96707458 $R^2$= .93523324 Adjusted $R^2$= .91094570 | | | | |
| F(3,8)=38.507 p<.00004 Std.Error of estimate: 1.9873 | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | 47.92 | 5.86 | 8.17 | 0.00 |
| *% non sulphide PGEM* | 0.19 | 0.03 | 7.12 | 0.00 |
| *pn/(pn+mil)* | 16.14 | 4.95 | 3.26 | 0.01 |
| *PGEM pred. degree of liberation* | -0.59 | 0.13 | -4.59 | 0.00 |

***Table 5*** *Regression summary for dependent variable 100-U with sample A5 excluded.*

| R= .80333529 $R^2$= .64534759 Adjusted $R^2$= .14883422<br>F(7,5)=1.2998 p<.39968 Std.Error of estimate: 1.8567 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(5)* | *p-level* |
| *Intercept* | 12.99 | 12.38 | 1.05 | 0.34 |
| *% non-sulphide PGE mineral* | -0.03 | 0.04 | -0.71 | 0.51 |
| *PGEM grain diameter at <2mm* | 0.12 | 3.43 | 0.04 | 0.97 |
| *pentlandite content* | 0.82 | 108.18 | 0.01 | 0.99 |
| *BMS grain diameter 1* | 0.12 | 0.23 | 0.54 | 0.61 |
| *pn/(pn+mil)* | 7.46 | 7.85 | 0.95 | 0.39 |
| *Predicted BMS liberation* | 0.08 | 0.08 | 0.99 | 0.37 |
| *Predicted PGEM liberation* | -0.31 | 0.15 | -2.11 | 0.09 |

***Table 6*** *Regression summary for dependent variable $k_f$. All fourteen samples included.*

| R= .95863501 $R^2$= .91898107 Adjusted $R^2$= .64891799<br>F(10,3)=3.4028 p<.17100 Std.Error of estimate: .19175 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(3)* | *p-level* |
| *Intercept* | 1.76 | 1.23 | 1.44 | 0.25 |
| *% non-sulphide PGE mineral* | 0.00 | 0.00 | 0.33 | 0.76 |
| *PGEM grain diameter at <2mm* | -0.90 | 0.44 | -2.02 | 0.14 |
| *pentlandite content* | -30.08 | 14.27 | -2.11 | 0.13 |
| *Nickel content* | 0.00 | 0.00 | 0.22 | 0.84 |
| *PGE+Au content* | 0.19 | 0.15 | 1.28 | 0.29 |
| *Copper content* | 0.00 | 0.00 | -0.02 | 0.98 |
| *BMS grain diameter at <2mm* | -0.01 | 0.02 | -0.62 | 0.58 |
| *pn/(pn+mil)* | 0.86 | 0.57 | 1.51 | 0.23 |
| *Predicted BMS liberation* | 0.02 | 0.01 | 2.13 | 0.12 |
| *Predicted PGEM liberation* | 0.02 | 0.01 | 1.48 | 0.23 |

***Table 7*** *Regression summary for dependent variable $k_s$. All fourteen samples included.*

| R= .94431250 $R^2$= .89172610 Adjusted $R^2$= .53081309 F(10,3)=2.4708 p<.24710 Std.Error of estimate: .01813 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(3)* | *p-level* |
| *Intercept* | 0.19 | 0.12 | 1.63 | 0.20 |
| *% non-sulphide PGE mineral* | 0.00 | 0.00 | 0.33 | 0.76 |
| *PGEM grain diameter at <2mm* | -0.01 | 0.04 | -0.12 | 0.91 |
| *pentlandite content* | 1.01 | 1.35 | 0.75 | 0.51 |
| *Nickel content* | 0.00 | 0.00 | -3.16 | 0.05 |
| *PGE+Au content* | 0.00 | 0.01 | -0.27 | 0.81 |
| *Copper content* | 0.00 | 0.00 | 1.36 | 0.27 |
| *BMS grain diameter at <2mm* | 0.00 | 0.00 | -1.04 | 0.37 |
| *pn/(pn+mil)* | -0.06 | 0.05 | -1.14 | 0.34 |
| *Predicted BMS liberation* | 0.00 | 0.00 | 0.40 | 0.72 |
| *Predicted PGEM liberation* | 0.00 | 0.00 | 1.38 | 0.26 |

***Table 8a*** *Observed and predicted values for $R_f$ with % non-sulphide PGE mineral and the PGE mineral degree of liberation as independent variables as independent variables, in turn excluding one of the samples.*

| **Sample number** | **$R_f$ Observed** | **$R_f$ Predicted (n=14)** | ***$R_f$ Predicted (n=13)** | **$R_f$ Observed – *$R_f$ predicted** |
|---|---|---|---|---|
| *A2* | 75.1 | 75.4 | 75.5 | -0.4 |
| *B2* | 80.3 | 77.5 | 77.0 | 3.3 |
| *A1* | 79.8 | 79.5 | 79.4 | 0.4 |
| *B1* | 73.8 | 69.7 | 69.3 | 4.5 |
| *A3* | 63.4 | 69.6 | 70.4 | -7.0 |
| *B3* | 74.4 | 72.4 | 72.2 | 2.2 |
| *A4* | 59.9 | 59.2 | 59.0 | 1.0 |
| *B4* | 56.5 | 60.9 | 63.1 | -6.6 |
| *A5* | 39.7 | 38.3 | 33.8 | 5.9 |
| *C1* | 66.3 | 72.1 | 73.0 | -6.6 |
| *C2* | 71.5 | 71.3 | 71.3 | 0.2 |
| *C3* | 68.2 | 66.7 | 66.3 | 1.9 |
| *C4* | 74.8 | 70.6 | 69.9 | 5.0 |
| *C5* | 74.8 | 75.3 | 75.3 | -0.5 |

**$R_f$ predicted : Value of $R_f$ determined from the regression equation calculated from the other 13 samples.*

***Table 8b*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral and the PGE mineral degree of liberation as independent variables, in turn excluding one sample.*

**Regression Summary for Dependent Variable: $R_f$** **A2 excluded**
R= .96031566 $R^2$= .92220617 Adjusted $R^2$= .90664740
F(2,10)=59.272 p<.00000 Std.Error of estimate: 3.4096

| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 40.80 | 5.54 | 7.37 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.07 | 6.48 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -9.62 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **B2 excluded**
R= .95891845 $R^2$= .91952459 Adjusted $R^2$= .90342951
F(2,10)=57.131 p<.00000 Std.Error of estimate: 3.3444

| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 41.49 | 5.53 | 7.50 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.07 | 6.20 | 0.00 |
| *% non sulphide PGEM* | -0.30 | 0.03 | -9.67 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **A1 excluded**
R= .95769222 $R^2$= .91717438 Adjusted $R^2$= .90060926
F(2,10)=55.368 p<.00000 Std.Error of estimate: 3.4093

| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 40.50 | 5.80 | 6.99 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.08 | 6.10 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -9.61 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **B1 excluded**
R= .96636749 $R^2$= .93386613 Adjusted $R^2$= .92063935
F(2,10)=70.604 p<.00000 Std.Error of estimate: 3.1607

| | B | St. Err. of B | t(10) | p-level |
|---|---|---|---|---|
| *Intercept* | 41.46 | 5.16 | 8.04 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.07 | 6.74 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -10.58 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **A3 excluded**
R= .97587086 $R^2$= .95232394 Adjusted $R^2$= .94278873
F(2,10)=99.874 p<.00000 Std.Error of estimate: 2.6865

| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 43.09 | 4.46 | 9.66 | 0.00 |
| *PGEM degree of liberation* | 0.45 | 0.06 | 7.78 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.02 | -12.62 | 0.00 |

**Regression Summary for Dependent Variable: $R_f$** **B3 excluded**
R= .96172249 $R^2$= .92491014 Adjusted $R^2$= .90989217
F(2,10)=61.587 p<.00000 Std.Error of estimate: 3.3604

| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
|---|---|---|---|---|
| *Intercept* | 41.16 | 5.49 | 7.49 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.07 | 6.39 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -9.89 | 0.00 |

***Table 8b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral and the PGE mineral degree of liberation as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A4 excluded** |
|---|---|---|---|---|
| R= .96033113 $R^2$= .92223588 Adjusted $R^2$= .90668306 | | | | |
| F(2,10)=59.297 p<.00000 Std.Error of estimate: 3.3729 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 41.90 | 5.91 | 7.09 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.08 | 5.98 | 0.00 |
| *% non sulphide PGEM* | -0.32 | 0.04 | -8.62 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B4 excluded** |
| R= .96412672 $R^2$= .92954033 Adjusted $R^2$= .91544840 | | | | |
| F(2,10)=65.963 p<.00000 Std.Error of estimate: 3.1269 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 38.37 | 5.37 | 7.15 | 0.00 |
| *PGEM degree of liberation* | 0.50 | 0.07 | 7.15 | 0.00 |
| *% non sulphide PGEM* | -0.29 | 0.03 | -8.78 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A5 excluded** |
| R= .90792959 $R^2$= .82433615 Adjusted $R^2$= .78920337 | | | | |
| F(2,10)=23.463 p<.00017 Std.Error of estimate: 3.3758 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 37.67 | 8.54 | 4.41 | 0.00 |
| *PGEM degree of liberation* | 0.51 | 0.12 | 4.40 | 0.00 |
| *% non sulphide PGEM* | -0.32 | 0.05 | -6.85 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C1 excluded** |
| R= .96778781 $R^2$= .93661324 Adjusted $R^2$= .92393589 | | | | |
| F(2,10)=73.881 p<.00000 Std.Error of estimate: 3.1208 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 42.15 | 5.16 | 8.17 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.07 | 6.86 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -10.77 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C2 excluded** |
| R= .96125836 $R^2$= .92401764 Adjusted $R^2$= .90882117 | | | | |
| F(2,10)=60.805 p<.00000 Std.Error of estimate: 3.4116 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 40.94 | 5.65 | 7.24 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.07 | 6.41 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -9.62 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C3 excluded** |
| R= .96276503 $R^2$= .92691650 Adjusted $R^2$= .91229981 | | | | |
| F(2,10)=63.415 p<.00000 Std.Error of estimate: 3.3564 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 39.36 | 5.97 | 6.59 | 0.00 |
| *PGEM degree of liberation* | 0.49 | 0.08 | 6.37 | 0.00 |
| *% non sulphide PGEM* | -0.30 | 0.03 | -9.74 | 0.00 |

***Table 8b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral and the PGE mineral degree of liberation as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_f$** **C4 excluded**<br>R= .96800335 $R^2$= .93703048 Adjusted $R^2$= .92443658<br>F(2,10)=74.403 p<.00000 Std.Error of estimate: 3.0710 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 38.68 | 5.17 | 7.48 | 0.00 |
| *PGEM degree of liberation* | 0.49 | 0.07 | 7.36 | 0.00 |
| *% non sulphide PGEM* | -0.30 | 0.03 | -10.39 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** **C5 excluded**<br>R= .96043776 $R^2$= .92244070 Adjusted $R^2$= .90692884<br>F(2,10)=59.467 p<.00000 Std.Error of estimate: 3.4092 | | | | |
| | *B* | *St. Err. of B* | *t(10)* | *p-level* |
| *Intercept* | 40.84 | 5.54 | 7.37 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.07 | 6.49 | 0.00 |
| *% non sulphide PGEM* | -0.31 | 0.03 | -9.60 | 0.00 |

***Table 9a*** *Observed and predicted values for $R_f$ with % non-sulphide PGE mineral PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite), and the PGE mineral degree of liberation as independent variables, in turn excluding one of the samples.*

| **Sample number** | **$R_f$ Observed** | **$R_f$ Predicted (n=14)** | ***$R_f$ Predicted (n=13)** | **$R_f$ Observed – *$R_f$ predicted** |
|---|---|---|---|---|
| *A2* | 79.8 | 78.3 | 77.8 | 2.0 |
| *B2* | 75.1 | 73.5 | 72.9 | 2.2 |
| *A1* | 63.4 | 64.8 | 66.5 | -3.1 |
| *B1* | 73.8 | 74.9 | 75.6 | -1.8 |
| *A3* | 80.3 | 80.2 | 76.3 | 4.0 |
| *B3* | 66.3 | 69.5 | 69.3 | -3.0 |
| *A4* | 71.5 | 73.1 | 74.0 | -2.6 |
| *B4* | 68.2 | 67.8 | 67.7 | 0.5 |
| *A5* | 74.8 | 71.9 | 70.7 | 4.2 |
| *C1* | 74.8 | 73.1 | 70.3 | 4.5 |
| *C2* | 59.9 | 59.4 | 58.7 | 1.2 |
| *C3* | 39.7 | 39.0 | 35.0 | 4.6 |
| *C4* | 74.4 | 75.8 | 76.4 | -2.0 |
| *C5* | 56.5 | 57.0 | 58.6 | -2.0 |

**$R_f$ predicted : Value of $R_f$ determined from the regression equation calculated from the other 13 samples.*

***Table 9b*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite) to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A2 excluded** |
|---|---|---|---|---|
| R= .99231764 $R^2$= .98469429 Adjusted $R^2$= .97376164 | | | | |
| F(5,7)=90.069 p<.00000 Std.Error of estimate: 1.8076 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 63.12 | 6.34 | 9.96 | 0.00 |
| *PGEM degree of liberation* | 0.48 | 0.04 | 11.00 | 0.00 |
| *% non-sulphide PGEM* | -0.33 | 0.02 | -13.99 | 0.00 |
| *PGEM grain diameter <2mm* | -9.69 | 1.93 | -5.01 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.67 | 0.03 |
| *pn/(pn+millerite)* | -8.60 | 2.22 | -3.87 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B2 excluded** |
| R= .99023825 $R^2$= .98057179 Adjusted $R^2$= .96669449 | | | | |
| F(5,7)=70.660 p<.00001 Std.Error of estimate: 1.9640 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 62.20 | 6.87 | 9.06 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.05 | 9.97 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.03 | -12.85 | 0.00 |
| *PGEM grain diameter <2mm* | -9.23 | 2.11 | -4.37 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.38 | 0.05 |
| *pn/(pn+millerite)* | -7.58 | 2.20 | -3.44 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A1 excluded** |
| R= .99057140 $R^2$= .98123170 Adjusted $R^2$= .96782577 | | | | |
| F(5,7)=73.194 p<.00001 Std.Error of estimate: 1.9397 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 62.80 | 6.93 | 9.07 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.05 | 9.74 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.03 | -13.36 | 0.00 |
| *PGEM grain diameter <2mm* | -9.28 | 2.03 | -4.57 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.42 | 0.05 |
| *pn/(pn+millerite)* | -7.79 | 2.23 | -3.49 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B1 excluded** |
| R= .99120020 $R^2$= .98247784 Adjusted $R^2$= .96996200 | | | | |
| F(5,7)=78.499 p<.00001 Std.Error of estimate: 1.9445 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 63.20 | 7.30 | 8.66 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.05 | 10.18 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.03 | -13.21 | 0.00 |
| *PGEM grain diameter <2mm* | -9.64 | 2.35 | -4.10 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.43 | 0.05 |
| *pn/(pn+millerite)* | -7.78 | 2.24 | -3.47 | 0.01 |

***Table 9b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite) to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A3 excluded** |
|---|---|---|---|---|
| R= .99237798 $R^2$= .98481405 Adjusted $R^2$= .97396694 | | | | |
| F(5,7)=90.790 p<.00000 Std.Error of estimate: 1.8122 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 60.07 | 6.54 | 9.18 | 0.00 |
| *PGEM degree of liberation* | 0.45 | 0.05 | 9.45 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.02 | -14.61 | 0.00 |
| *PGEM grain diameter <2mm* | -7.71 | 2.28 | -3.38 | 0.01 |
| *BMS degree of liberation* | 0.07 | 0.03 | 2.15 | 0.07 |
| *pn/(pn+millerite)* | -5.50 | 2.74 | -2.00 | 0.09 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B3 excluded** |
| R= .99141211 $R^2$= .98289798 Adjusted $R^2$= .97068224 | | | | |
| F(5,7)=80.462 p<.00000 Std.Error of estimate: 1.9168 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 63.33 | 6.96 | 9.10 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.05 | 10.33 | 0.00 |
| *% non-sulphide PGEM* | -0.35 | 0.03 | -13.33 | 0.00 |
| *PGEM grain diameter <2mm* | -9.64 | 2.14 | -4.50 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.46 | 0.04 |
| *pn/(pn+millerite)* | -7.61 | 2.15 | -3.55 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **A4 excluded** |
| R= .99094658 $R^2$= .98197513 Adjusted $R^2$= .96910022 | | | | |
| F(5,7)=76.270 p<.00001 Std.Error of estimate: 1.9409 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 62.20 | 6.74 | 9.23 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.05 | 8.81 | 0.00 |
| *% non-sulphide PGEM* | -0.35 | 0.03 | -12.41 | 0.00 |
| *PGEM grain diameter <2mm* | -9.00 | 2.04 | -4.41 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.45 | 0.04 |
| *pn/(pn+millerite)* | -7.34 | 2.23 | -3.29 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **B4 excluded** |
| R= .99025840 $R^2$= .98061170 Adjusted $R^2$= .96676291 | | | | |
| F(5,7)=70.808 p<.00001 Std.Error of estimate: 1.9605 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 60.25 | 10.99 | 5.48 | 0.00 |
| *PGEM degree of liberation* | 0.48 | 0.05 | 8.84 | 0.00 |
| *% non-sulphide PGEM* | -0.33 | 0.04 | -7.84 | 0.00 |
| *PGEM grain diameter <2mm* | -8.73 | 2.83 | -3.09 | 0.02 |
| *BMS degree of liberation* | 0.08 | 0.04 | 2.28 | 0.06 |
| *pn/(pn+millerite)* | -7.56 | 2.19 | -3.45 | 0.01 |

***Table 9b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite) to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_f$** | | | | **A5 excluded** |
|---|---|---|---|---|
| R= .97920845 $R^2$= .95884918 Adjusted $R^2$= .92945574 | | | | |
| F(5,7)=32.621 p<.00010 Std.Error of estimate: 1.9529 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 59.42 | 10.81 | 5.50 | 0.00 |
| *PGEM degree of liberation* | 0.50 | 0.10 | 5.21 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.03 | -12.26 | 0.00 |
| *PGEM grain diameter <2mm* | -8.91 | 2.16 | -4.13 | 0.00 |
| *BMS degree of liberation* | 0.08 | 0.03 | 2.38 | 0.05 |
| *pn/(pn+millerite)* | -7.88 | 2.40 | -3.28 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C1 excluded** |
| R= .99316814 $R^2$= .98638296 Adjusted $R^2$= .97665651 | | | | |
| F(5,7)=101.41 p<.00000 Std.Error of estimate: 1.7289 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 62.23 | 6.00 | 10.37 | 0.00 |
| *PGEM degree of liberation* | 0.48 | 0.04 | 11.52 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.02 | -15.26 | 0.00 |
| *PGEM grain diameter <2mm* | -8.67 | 1.82 | -4.75 | 0.00 |
| *BMS degree of liberation* | 0.06 | 0.03 | 1.94 | 0.09 |
| *pn/(pn+millerite)* | -7.64 | 1.94 | -3.95 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C2 excluded** |
| R= .99406352 $R^2$= .98816227 Adjusted $R^2$= .97970675 | | | | |
| F(5,7)=116.87 p<.00000 Std.Error of estimate: 1.6095 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 61.87 | 5.59 | 11.07 | 0.00 |
| *PGEM degree of liberation* | 0.47 | 0.04 | 12.31 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.02 | -16.12 | 0.00 |
| *PGEM grain diameter <2mm* | -9.38 | 1.67 | -5.60 | 0.00 |
| *BMS degree of liberation* | 0.10 | 0.03 | 3.42 | 0.01 |
| *pn/(pn+millerite)* | -9.31 | 2.03 | -4.58 | 0.00 |
| **Regression Summary for Dependent Variable: $R_f$** | | | | **C3 excluded** |
| R= .99140382 $R^2$= .98288153 Adjusted $R^2$= .97065406 | | | | |
| F(5,7)=80.383 p<.00000 Std.Error of estimate: 1.9415 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 61.79 | 6.77 | 9.12 | 0.00 |
| *PGEM degree of liberation* | 0.48 | 0.05 | 9.85 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.02 | -13.64 | 0.00 |
| *PGEM grain diameter <2mm* | -9.15 | 2.01 | -4.55 | 0.00 |
| *BMS degree of liberation* | 0.07 | 0.03 | 2.14 | 0.07 |
| *pn/(pn+millerite)* | -7.32 | 2.24 | -3.26 | 0.01 |

***Table 9b continued*** *Regression summary for dependent variable $R_f$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, base-metal sulphide degree of liberation, PGE mineral grain size prior, pentlandite/(pentlandite+millerite) to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_f$** **C4 excluded**<br>R= .99504397 R $R^2$= .99011250 Adjusted $R^2$= .98305001<br>F(5,7)=140.19 p<.00000 Std.Error of estimate: 1.4545 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 61.62 | 5.05 | 12.20 | 0.00 |
| *PGEM degree of liberation* | 0.48 | 0.03 | 13.72 | 0.00 |
| *% non-sulphide PGEM* | -0.34 | 0.02 | -18.33 | 0.00 |
| *PGEM grain diameter <2mm* | -9.00 | 1.51 | -5.96 | 0.00 |
| *BMS degree of liberation* | 0.06 | 0.03 | 2.32 | 0.05 |
| *pn/(pn+millerite)* | -6.01 | 1.75 | -3.43 | 0.01 |
| **Regression Summary for Dependent Variable: $R_f$** **C5 excluded**<br>R= .99169877 $R^2$= .98346645 Adjusted $R^2$= .97165678<br>F(5,7)=83.276 p<.00000 Std.Error of estimate: 1.8813 | | | | |
| | *B* | *St. Err. of B* | *t(7)* | *p-level* |
| *Intercept* | 60.24 | 6.92 | 8.71 | 0.00 |
| *PGEM degree of liberation* | 0.46 | 0.05 | 9.66 | 0.00 |
| *% non-sulphide PGEM* | -0.33 | 0.03 | -12.93 | 0.00 |
| *PGEM grain diameter <2mm* | -9.03 | 1.96 | -4.62 | 0.00 |
| *BMS degree of liberation* | 0.11 | 0.05 | 2.31 | 0.05 |
| *pn/(pn+millerite)* | -7.65 | 2.11 | -3.63 | 0.01 |

***Table 10a*** *Observed and predicted values for variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling, as independent variables, in turn excluding one of the samples.*

| Sample number | $R_s$ Observed | $R_s$ Predicted (n=14) | *$R_s$ Predicted (n=13) | $R_s$ Observed – *$R_s$ predicted |
|---|---|---|---|---|
| *A2* | 16.3 | 17.5 | 18.3 | -1.2 |
| *B2* | 18.8 | 18.4 | 18.4 | 0.4 |
| *A1* | 25.9 | 25.9 | 26.0 | -0.1 |
| *B1* | 19.6 | 19.5 | 19.5 | 0.1 |
| *A3* | 15.3 | 15.6 | 15.7 | -0.3 |
| *B3* | 24.5 | 24.4 | 24.4 | 0.2 |
| *A4* | 22.6 | 23.0 | 23.1 | -0.5 |
| *B4* | 24.0 | 24.8 | 24.9 | -0.9 |
| *A5* | 19.9 | 18.9 | 18.3 | 1.0 |
| *C1* | 21.1 | 20.7 | 20.6 | 0.4 |
| *C2* | 33.7 | 34.0 | 34.0 | -0.3 |
| *C3* | 28.7 | 28.9 | 30.8 | -0.2 |
| *C4* | 21.0 | 20.2 | 19.8 | 0.8 |
| *C5* | 37.7 | 37.3 | 36.4 | 0.4 |

*$R_s$ predicted : *Value of $R_s$ determined from the regression equation calculated for the other 13 samples.*

***Table 10b*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **A2 excluded** |
|---|---|---|---|---|
| *$R$= .99640518 $R^2$= .99282328 Adjusted $R^2$= .98923491* | | | | |
| *$F(4,8)$=276.68 $p$<.00000 Std.Error of estimate: .66807* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -6.02 | 2.14 | -2.81 | 0.02 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.29 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 19.97 | 0.00 |
| *PGEM ECD <2mm* | 5.98 | 0.69 | 8.65 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 10.32 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **B2 excluded** |
| *$R$= .99594658 $R^2$= .99190959 Adjusted $R^2$= .98786439* | | | | |
| *$F(4,8)$=245.21 $p$<.00000 Std.Error of estimate: .67398* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -5.94 | 2.19 | -2.71 | 0.03 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -6.82 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 19.52 | 0.00 |
| *PGEM ECD <2mm* | 5.99 | 0.70 | 8.55 | 0.00 |
| *Chromite ECD <2mm* | 0.12 | 0.01 | 9.95 | 0.00 |

***Table 10b continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_s$** **A1 excluded**<br>*$R$= .99638789 $R^2$= .99278883 Adjusted $R^2$= .98918324*<br>*$F(4,8)$=275.35 $p$<.00000 Std.Error of estimate: .66609* | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -3.96 | 4.43 | -0.90 | 0.40 |
| *PGEM degree of liberation* | -0.17 | 0.03 | -6.06 | 0.00 |
| *% non-sulphide PGEM* | 0.21 | 0.02 | 12.39 | 0.00 |
| *PGEM ECD <2mm* | 5.94 | 0.70 | 8.46 | 0.00 |
| *Chromite ECD <2mm* | 0.12 | 0.02 | 6.61 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **B1 excluded**<br>*$R$= .99636838 $R^2$= .99274995 Adjusted $R^2$= .98912492*<br>*$F(4,8)$=273.86 $p$<.00000 Std.Error of estimate: .67678* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -5.88 | 2.38 | -2.47 | 0.04 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.22 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 18.25 | 0.00 |
| *PGEM ECD <2mm* | 5.95 | 0.81 | 7.38 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 10.19 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **A3 excluded**<br>*$R$= .99640518 $R^2$= .99282328 Adjusted $R^2$= .98923491*<br>*$F(4,8)$=276.68 $p$<.00000 Std.Error of estimate: .66807* | | | | |
| | B | St. Err. of B | t(8) | p-level |
| *Intercept* | -6.02 | 2.14 | -2.81 | 0.02 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.29 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 19.97 | 0.00 |
| *PGEM ECD <2mm* | 5.98 | 0.69 | 8.65 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 10.32 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **A4 excluded**<br>*$R$= .99571841 $R^2$= .99145516 Adjusted $R^2$= .98718274*<br>*$F(4,8)$=232.06 $p$<.00000 Std.Error of estimate: .66131* | | | | |
| | B | St. Err. of B | t(8) | p-level |
| *Intercept* | -6.29 | 2.16 | -2.91 | 0.02 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.42 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 19.86 | 0.00 |
| *PGEM ECD <2mm* | 5.94 | 0.69 | 8.61 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 10.24 | 0.00 |

***Table 10 continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_s$** | | | | **B3 excluded** |
|---|---|---|---|---|
| *$R$= .99714580 $R^2$= .99429975 Adjusted $R^2$= .99144963* | | | | |
| *$F(4,8)$=348.86 $p$<.00000 Std.Error of estimate: .60564* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -7.12 | 2.09 | -3.41 | 0.01 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.56 | 0.00 |
| *% non-sulphide PGEM* | 0.21 | 0.01 | 20.22 | 0.00 |
| *PGEM ECD <2mm* | 6.56 | 0.73 | 8.96 | 0.00 |
| *Chromite ECD <2mm* | 0.12 | 0.01 | 10.31 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **B4 excluded** |
| *$R$= .99485165 $R^2$= .98972981 Adjusted $R^2$= .98459472* | | | | |
| *$F(4,8)$=192.74 $p$<.00000 Std.Error of estimate: .62593* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -3.48 | 2.96 | -1.18 | 0.27 |
| *PGEM degree of liberation* | -0.18 | 0.02 | -7.48 | 0.00 |
| *% non-sulphide PGEM* | 0.19 | 0.01 | 13.98 | 0.00 |
| *PGEM ECD <2mm* | 5.36 | 0.85 | 6.29 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 11.23 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **A5 excluded** |
| *$R$= .99638789 $R^2$= .99278883 Adjusted $R^2$= .98918324* | | | | |
| *$F(4,8)$=275.35 $p$<.00000 Std.Error of estimate: .66609* | | | | |
| | B | St. Err. of B | t(8) | p-level |
| *Intercept* | -3.96 | 4.43 | -0.90 | 0.40 |
| *PGEM degree of liberation* | -0.17 | 0.03 | -6.06 | 0.00 |
| *% non-sulphide PGEM* | 0.21 | 0.02 | 12.39 | 0.00 |
| *PGEM ECD <2mm* | 5.94 | 0.70 | 8.46 | 0.00 |
| *Chromite ECD <2mm* | 0.12 | 0.02 | 6.61 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** | | | | **C1 excluded** |
| *$R$= .99699872 $R^2$= .99400644 Adjusted $R^2$= .99100967* | | | | |
| *$F(4,8)$=331.69 $p$<.00000 Std.Error of estimate: .62448* | | | | |
| | B | St. Err. of B | t(8) | p-level |
| *Intercept* | -6.36 | 2.02 | -3.14 | 0.01 |
| *PGEM degree of liberation* | -0.17 | 0.02 | -7.95 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 21.34 | 0.00 |
| *PGEM ECD <2mm* | 6.14 | 0.65 | 9.43 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 11.24 | 0.00 |

***Table 10 continued*** *Regression summary for dependent variable $R_s$ with % non-sulphide PGE mineral, PGE mineral degree of liberation, chromite grain diameter and PGE mineral diameter prior to milling as independent variables, in turn excluding one sample.*

| **Regression Summary for Dependent Variable: $R_s$** **C2 excluded**<br>*$R$= .99646806 $R^2$= .99294860 Adjusted $R^2$= .98942290*<br>*$F(4,8)$=281.63 $p$<.00000 Std.Error of estimate: .67745* | | | | |
|---|---|---|---|---|
| | B | St. Err. of B | t(8) | p-level |
| *Intercept* | -6.03 | 2.18 | -2.77 | 0.02 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.21 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 19.68 | 0.00 |
| *PGEM ECD <2mm* | 6.01 | 0.70 | 8.55 | 0.00 |
| *Chromite ECD <2mm* | 0.12 | 0.01 | 10.30 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **C3 excluded**<br>*$R$= .99730367 $R^2$= .99461461 Adjusted $R^2$= .99192191*<br>*$F(4,8)$=369.38 $p$<.00000 Std.Error of estimate: .59246* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -5.49 | 1.93 | -2.84 | 0.02 |
| *PGEM degree of liberation* | -0.18 | 0.02 | -8.02 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 21.36 | 0.00 |
| *PGEM ECD <2mm* | 5.90 | 0.61 | 9.61 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 11.50 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **C4 excluded**<br>*$R$= .99716555 $R^2$= .99433913 Adjusted $R^2$= .99150870*<br>*$F(4,8)$=351.30 $p$<.00000 Std.Error of estimate: .59931* | | | | |
| | B | St. Err. of B | t(8) | p-level |
| *Intercept* | -5.87 | 1.93 | -3.05 | 0.02 |
| *PGEM degree of liberation* | -0.17 | 0.02 | -8.30 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 21.05 | 0.00 |
| *PGEM ECD <2mm* | 5.61 | 0.68 | 8.31 | 0.00 |
| *Chromite ECD <2mm* | 0.13 | 0.01 | 11.03 | 0.00 |
| **Regression Summary for Dependent Variable: $R_s$** **C5 excluded**<br>*$R$= .99668489 $R^2$= .99338078 Adjusted $R^2$= .99007116*<br>*$F(4,8)$=300.15 $p$<.00000 Std.Error of estimate: .65301* | | | | |
| | *B* | *St. Err. of B* | *t(8)* | *p-level* |
| *Intercept* | -6.01 | 2.10 | -2.87 | 0.02 |
| *PGEM degree of liberation* | -0.16 | 0.02 | -7.52 | 0.00 |
| *% non-sulphide PGEM* | 0.20 | 0.01 | 20.37 | 0.00 |
| *PGEM ECD <2mm* | 6.01 | 0.67 | 8.94 | 0.00 |
| *Chromite ECD <2mm* | 0.12 | 0.01 | 10.66 | 0.00 |

***Table 11*** *Regression summary for dependent variable 100-U excluding sample A5.*

| $R= .88368204\ R^2= .78089395$ Adjusted $R^2= .56178790$<br>$F(6,6)=3.5640\ p<.07365$ Std.Error of estimate: 1.3322 | | | | |
|---|---|---|---|---|
| | *B* | *St. Err. of B* | *t(6)* | *p-level* |
| *Intercept* | 21.42 | 6.50 | 3.29 | 0.02 |
| *PGEM degree of liberation* | -0.33 | 0.08 | -3.98 | 0.01 |
| *% non-sulphide PGEM* | 0.06 | 0.03 | 2.35 | 0.06 |
| *PGEM ECD 80%<75µm* | 3.63 | 3.51 | 1.03 | 0.34 |
| *BMS degree of liberation* | -0.05 | 0.03 | -1.75 | 0.13 |
| *BMS ECD 80%<75µm* | 0.25 | 0.19 | 1.30 | 0.24 |
| *pn/(pn+mil)* | 5.61 | 2.38 | 2.36 | 0.06 |

***Table 12*** *Regression summary for dependent variable $k_f$. All fourteen samples included.*

| $R= .92487051\ R^2= .85538547$ Adjusted $R^2=$ -----<br>$F(12,1)=.49291\ p<.82017$ Std.Error of estimate: .44372 | | | | |
|---|---|---|---|---|
| | B | St. Err. of B | t(1) | p-level |
| Intercept | 1.39 | 8.83 | 0.16 | 0.90 |
| PGEM degree of liberation | 0.01 | 0.03 | 0.48 | 0.72 |
| % non-sulphide PGEM | 0.00 | 0.01 | -0.09 | 0.95 |
| PGEM ECD 80%<75µm | 0.51 | 1.20 | 0.42 | 0.74 |
| pentlandite content | -20.52 | 31.24 | -0.66 | 0.63 |
| PGEM/(PGEM+BMS) | -2.28 | 6.69 | -0.34 | 0.79 |
| Chromite ECD <2mm | 0.00 | 0.03 | 0.02 | 0.98 |
| BMS degree of liberation | 0.00 | 0.01 | 0.24 | 0.85 |
| BMS ECD 80%<75µm | -0.03 | 0.10 | -0.29 | 0.82 |
| pn/(pn+mil) | 0.81 | 1.67 | 0.48 | 0.71 |

***Table 13*** *Regression summary for dependent variable $k_s$. All fourteen samples included.*

| $R= .93283790\ R^2= .87018655$ Adjusted $R^2= .57810628$<br>$F(9,4)=2.9793\ p<.15267$ Std.Error of estimate: .01719 | | | | |
|---|---|---|---|---|
| | B | St. Err. of B | t(4) | p-level |
| Intercept | 0.44 | 0.19 | 2.38 | 0.08 |
| PGEM degree of liberation | 0.00 | 0.00 | 0.27 | 0.80 |
| % non-sulphide PGEM | 0.00 | 0.00 | -1.04 | 0.36 |
| PGEM ECD 80%<75µm | -0.01 | 0.04 | -0.20 | 0.85 |
| pentlandite content | 0.58 | 0.88 | 0.66 | 0.55 |
| PGEM/(PGEM+BMS) | -0.20 | 0.11 | -1.75 | 0.16 |
| Chromite ECD <2mm | 0.00 | 0.00 | 0.44 | 0.68 |
| BMS degree of liberation | 0.00 | 0.00 | -0.25 | 0.81 |
| BMS ECD 80%<75µm | -0.01 | 0.00 | -2.44 | 0.07 |
| pn/(pn+mil) | -0.06 | 0.06 | -0.99 | 0.38 |