6. CONCLUSIONS

From the results it can be concluded that the solidified slags have a nearly single-phase structure. This is in the form of M_3O_5 (Pseudobrookite). This near single-phase structure could be attributed to the presence of a eutectic groove close to the pseudobrookite composition. Results obtained from FACTSage showed that the M_3O_5 slag composition does not lie at the minimum liquidus temperature.

An effect that is expected to play a significant role in the ilmenite smelter is the interaction of the slag with the freeze lining. It is predicted that the slag composition is stabilised close to M_3O_5 stoichiometry through solidification equilibrium with the freeze lining: a eutectic exists on the TiO_2-rich side of M_3O_5 which constrains the slag to a composition close to pseudobrookite. It was expected that such a slag would solidify as pseudobrookite and either rutile or Magéli phases. This was confirmed by XRD and SEM analysis.

All of the above can also be brought into context with slag foaming. It was concluded that the most important factors attributing to foaming are temperature and slag composition. Earlier results indicated that viscosity does not significantly affect slag foaming whereas the presence of solid particles has a significant effect. The very narrow solidification range of these slags is expected to contribute significantly to their prospensity to foam.