

Supplementary Data:

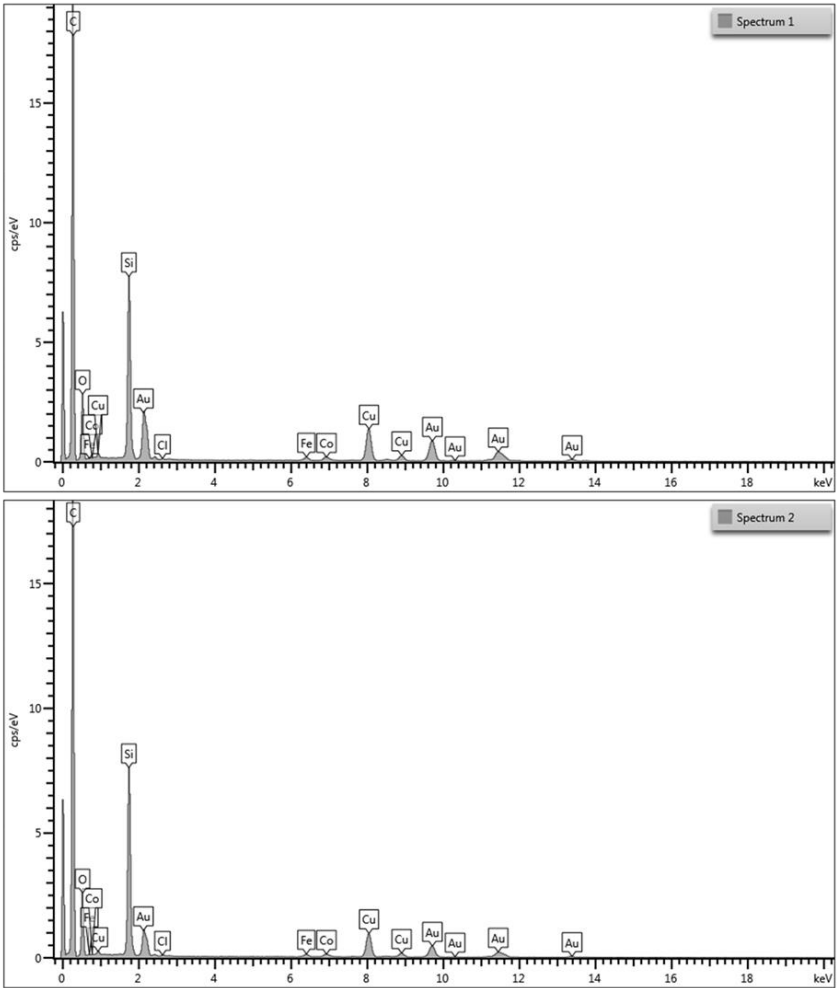
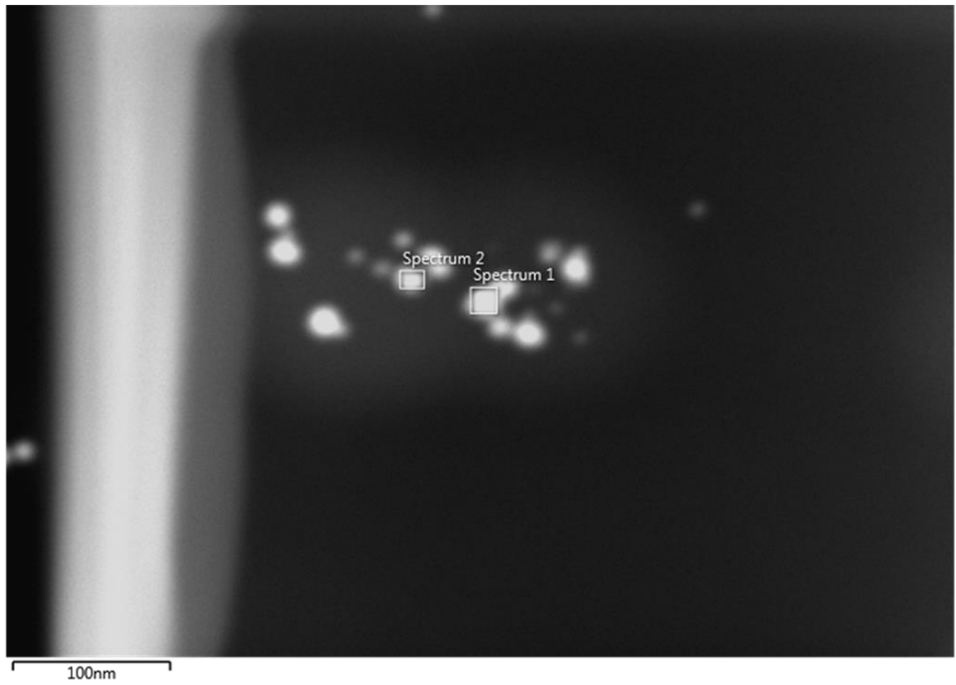


Figure 1: EDS spectra of HO-MeOH + GA AuNPs

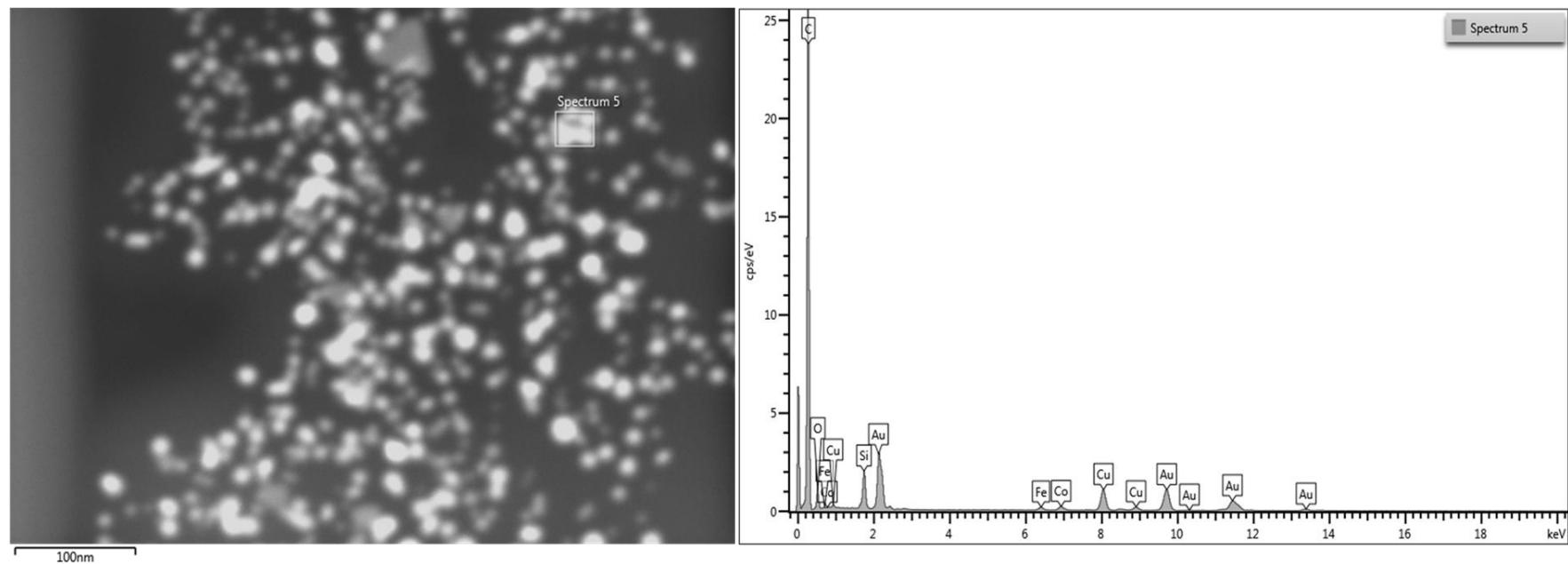


Figure 2: EDS spectra of HO-MeOH – GA AuNPs

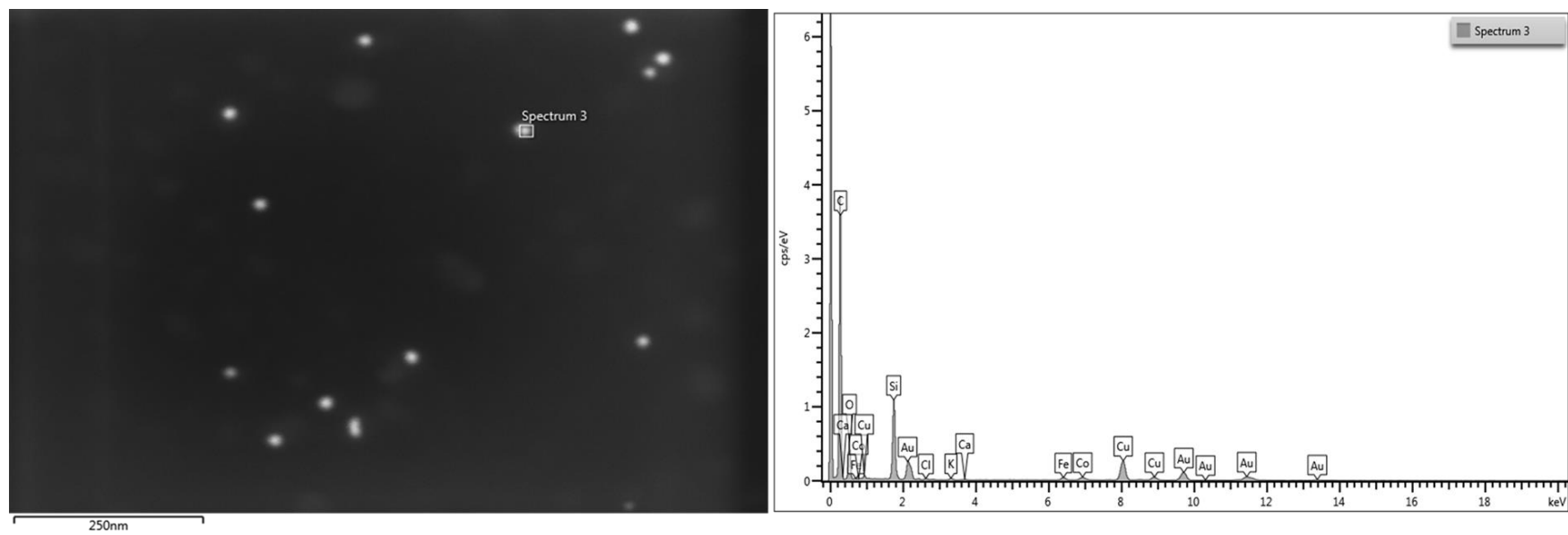


Figure 3: EDS spectra of HO-Powder + GA AuNPs

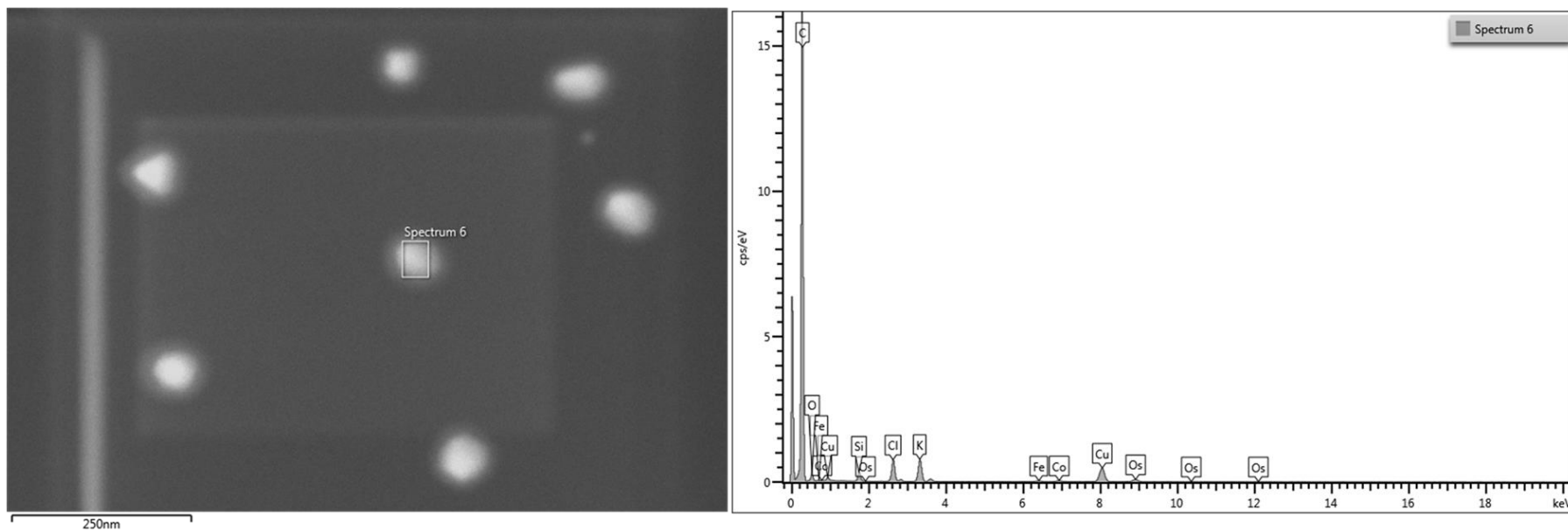


Figure 4: EDS spectra of HO-Powder - GA AuNPs

Sample Details

Sample Name: HO MeOH Stab 1
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 13 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

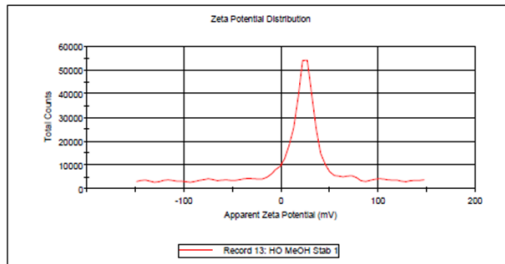
System

Temperature (°C): 25.0 Zeta Runs: 100
Count Rate (kcps): 2.3 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -2.58	Peak 1: 22.7	64.1	16.8
Zeta Deviation (mV): 137	Peak 2: 107	6.7	12.7
Conductivity (mS/cm): 1.98	Peak 3: -112	5.4	11.4

Result quality See result quality report



Sample Details

Sample Name: HO MeOH Stab 2
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 14 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

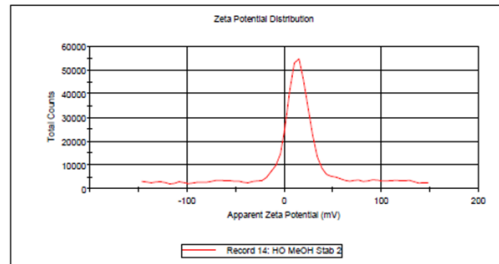
System

Temperature (°C): 25.0 Zeta Runs: 100
Count Rate (kcps): 2.5 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -3.01	Peak 1: 14.8	71.0	17.8
Zeta Deviation (mV): 134	Peak 2: -59.1	6.1	13.0
Conductivity (mS/cm): 2.02	Peak 3: 112	4.0	8.06

Result quality See result quality report



Sample Details

Sample Name: HO MeOH Stab 3
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 15 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

Temperature (°C): 25.0 Zeta Runs: 100
Count Rate (kcps): 2.2 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -2.76	Peak 1: 22.1	72.2	25.3
Zeta Deviation (mV): 148	Peak 2: -107	4.8	9.30
Conductivity (mS/cm): 2.04	Peak 3: 124	4.3	7.71

Result quality See result quality report

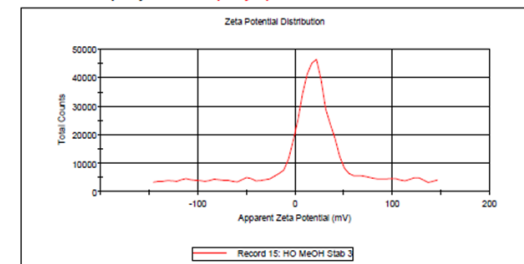


Figure 5: Zeta potential charges of 3 runs of HO-MEOH + GA AuNPs

Sample Details

Sample Name: HO MeOH Unstab 1
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 16 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

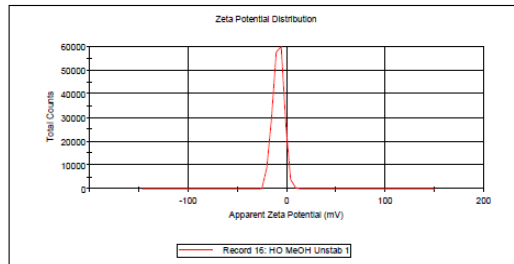
Temperature (°C): 25.0 Zeta Runs: 12
Count Rate (kcps): 23.2 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-8.49	100.0	5.55
Zeta Deviation (mV):	5.55	0.0	0.00
Conductivity (mS/cm):	2.31	0.0	0.00

Peak 1: -8.46
Peak 2: 0.00
Peak 3: 0.00

Result quality See result quality report



Sample Details

Sample Name: HO MeOH Unstab 2
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 17 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

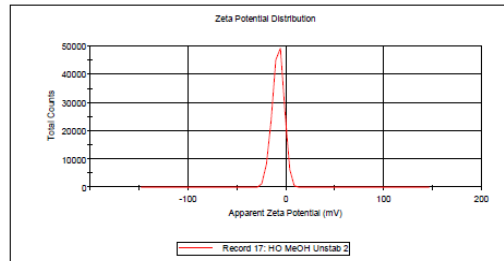
Temperature (°C): 25.0 Zeta Runs: 12
Count Rate (kcps): 19.2 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-8.08	100.0	5.91
Zeta Deviation (mV):	5.91	0.0	0.00
Conductivity (mS/cm):	2.28	0.0	0.00

Peak 1: -8.08
Peak 2: 0.00
Peak 3: 0.00

Result quality See result quality report



Sample Details

Sample Name: HO MeOH Unstab 3
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 18 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

Temperature (°C): 25.0 Zeta Runs: 12
Count Rate (kcps): 17.2 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-7.26	100.0	7.38
Zeta Deviation (mV):	7.38	0.0	0.00
Conductivity (mS/cm):	2.30	0.0	0.00

Peak 1: -7.26
Peak 2: 0.00
Peak 3: 0.00

Result quality See result quality report

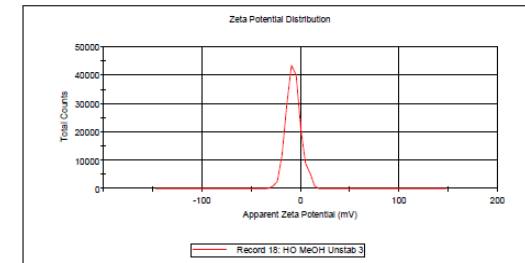


Figure 6: Zeta potential charges of 3 runs of HO-MEOH - GA AuNPs



Sample Details

Sample Name: HO Powder Stab 1
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 19 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

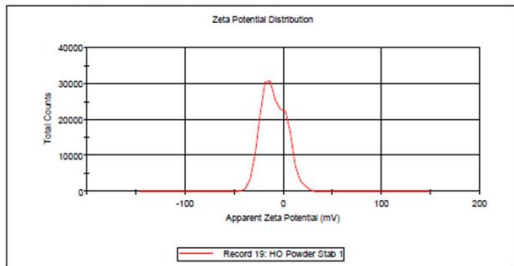
System

Temperature (°C): 25.0 Zeta Runs: 20
Count Rate (kops): 9.4 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -9.47	Peak 1: -9.47	100.0	12.4
Zeta Deviation (mV): 12.4	Peak 2: 0.00	0.0	0.00
Conductivity (mS/cm): 1.88	Peak 3: 0.00	0.0	0.00

Result quality See result quality report



Sample Details

Sample Name: HO Powder Stab 2
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 20 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

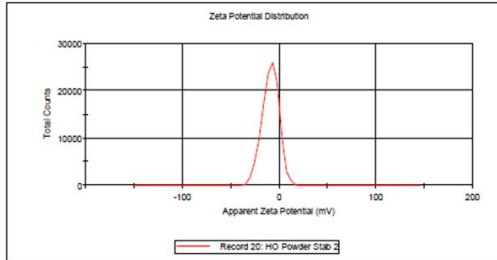
System

Temperature (°C): 25.0 Zeta Runs: 12
Count Rate (kops): 10.4 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -9.03	Peak 1: -9.03	100.0	8.48
Zeta Deviation (mV): 8.48	Peak 2: 0.00	0.0	0.00
Conductivity (mS/cm): 1.74	Peak 3: 0.00	0.0	0.00

Result quality See result quality report



Sample Details

Sample Name: HO Powder Stab 3
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 21 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

Temperature (°C): 25.0 Zeta Runs: 12
Count Rate (kops): 8.6 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -9.19	Peak 1: -9.19	100.0	6.71
Zeta Deviation (mV): 6.71	Peak 2: 0.00	0.0	0.00
Conductivity (mS/cm): 1.68	Peak 3: 0.00	0.0	0.00

Result quality See result quality report

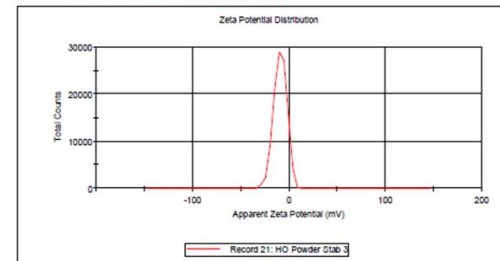


Figure 7: Zeta potential charges of 3 runs of Ho-Powder + GA AuNPs



Sample Details

Sample Name: HO Powder Unstab 1
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 22 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

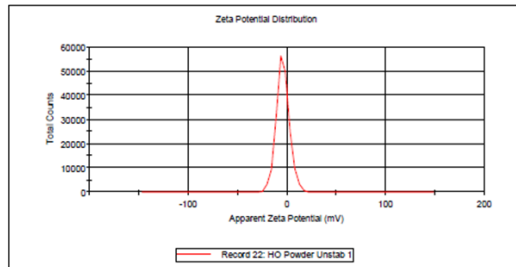
System

Temperature (°C): 25.0 Zeta Runs: 28
Count Rate (kcps): 6.4 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -4.14	Peak 1: -4.14	100.0	6.58
Zeta Deviation (mV): 6.58	Peak 2: 0.00	0.0	0.00
Conductivity (mS/cm): 2.01	Peak 3: 0.00	0.0	0.00

Result quality [See result quality report](#)



Sample Details

Sample Name: HO Powder Unstab 2
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 23 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

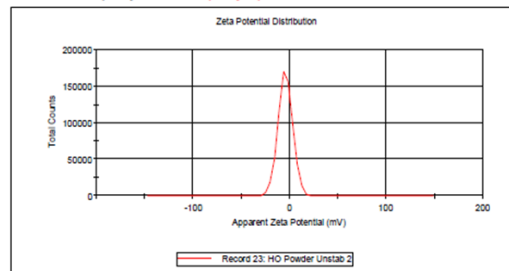
System

Temperature (°C): 25.0 Zeta Runs: 78
Count Rate (kcps): 7.8 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -4.22	Peak 1: -4.22	100.0	7.39
Zeta Deviation (mV): 7.39	Peak 2: 0.00	0.0	0.00
Conductivity (mS/cm): 2.03	Peak 3: 0.00	0.0	0.00

Result quality [See result quality report](#)



Sample Details

Sample Name: HO Powder Unstab 3
SOP Name: mansettings.nano
General Notes:

File Name: Au NPs.dts Dispersant Name: Water
Record Number: 24 Dispersant RI: 1.330
Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

Temperature (°C): 25.0 Zeta Runs: 12
Count Rate (kcps): 6.5 Measurement Position (mm): 4.50
Cell Description: Zeta dip cell Attenuator: 11

Results

	Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -3.54	Peak 1: -3.54	100.0	9.28
Zeta Deviation (mV): 9.28	Peak 2: 0.00	0.0	0.00
Conductivity (mS/cm): 2.00	Peak 3: 0.00	0.0	0.00

Result quality [See result quality report](#)

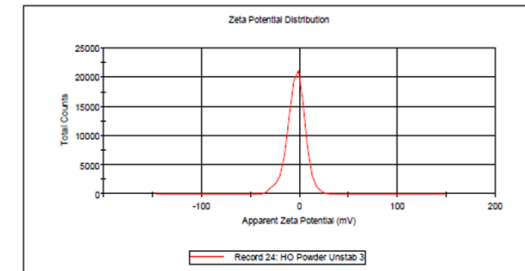


Figure 8: Zeta potential charges of 3 runs of Ho-Powder - GA AuNPs

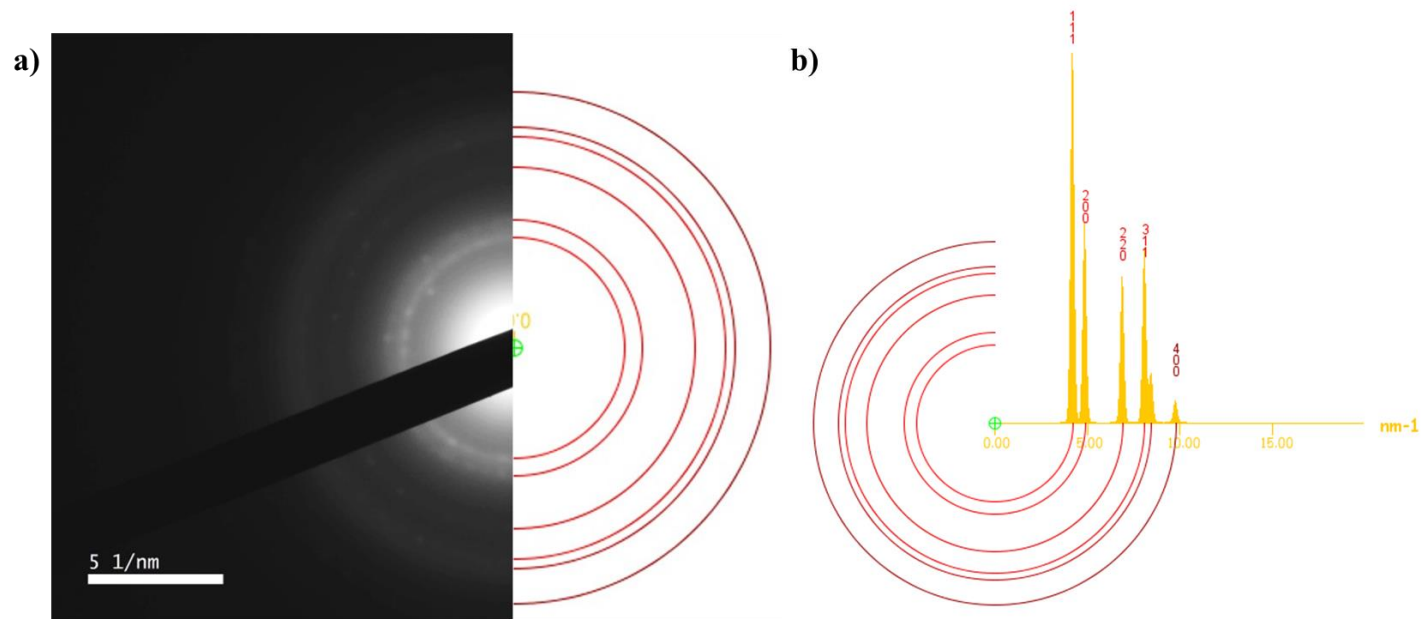


Figure 9: a) Sherrer ring patterns matching b) the gold standard for face centred cubic crystal structure