Supplementary Data:

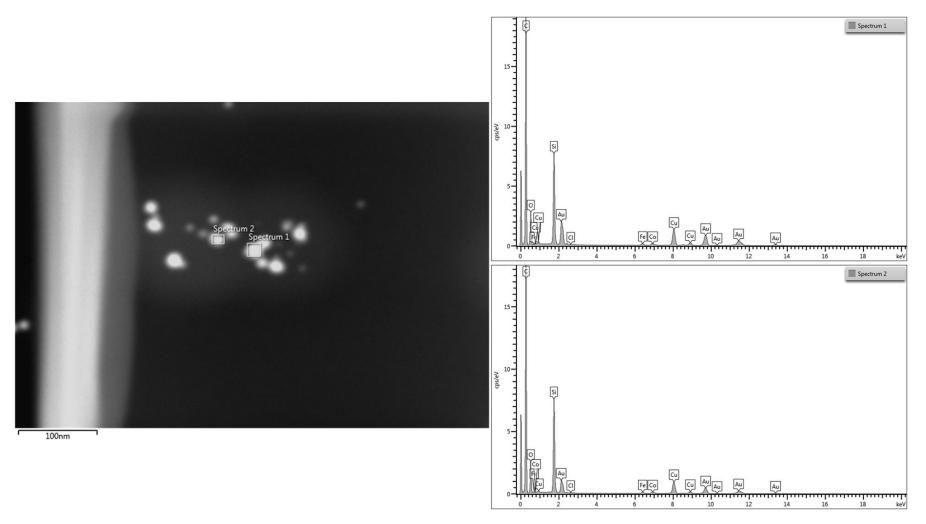


Figure 1: EDS spectra of HO-MeOH + GA AuNPs

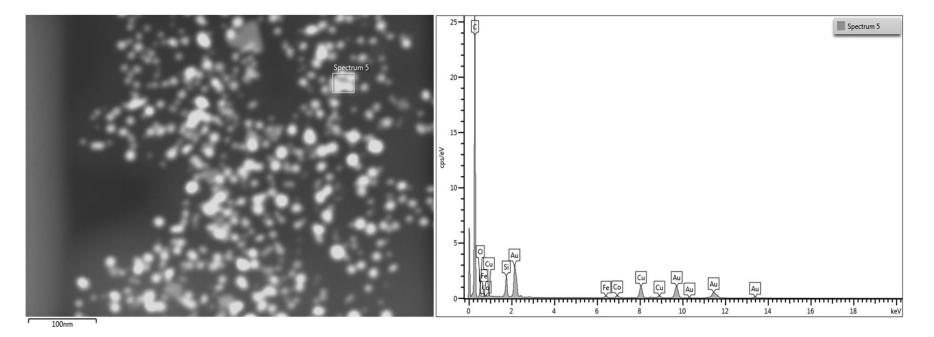


Figure 2: EDS spectra of HO-MeOH – GA AuNPs

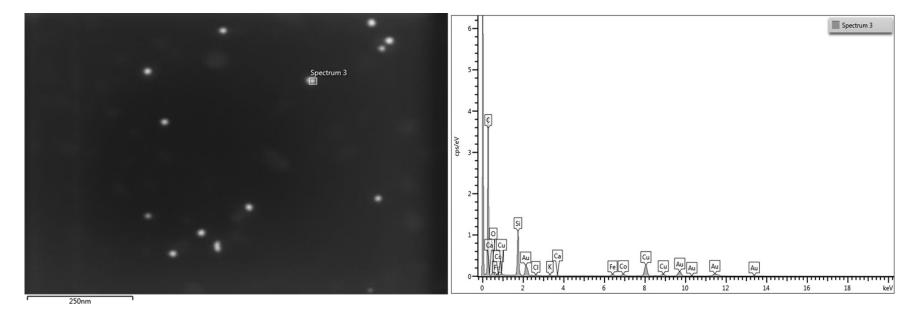


Figure 3: EDS spectra of HO-Powder + GA AuNPs

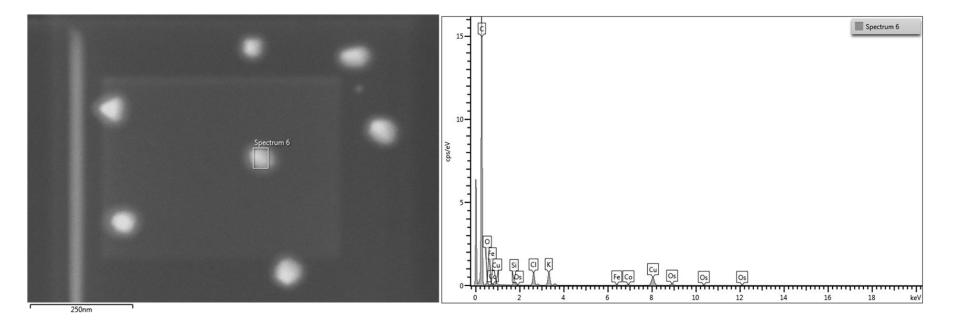


Figure 4: EDS spectra of HO-Powder - GA AuNPs



Sample Details

System

Results

General Notes:

Record Number: 13

Temperature (°C): 25.0

Count Rate (kcps): 2.3

Zeta Potential (mV): -2.58

Zeta Deviation (mV): 137

Conductivity (mS/cm): 1.98

60000

5000

40000

30000

20000

10000

Cell Description: Zeta dip cell

Result quality See result quality report

-100

Sample Name: HO MeOH Stab 1

File Name: Au NPs.dts

SOP Name: mansettings.nano

Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872



Dispersant Name: Water

Dispersant Dielectric Constant: 78.5

Measurement Position (mm): 4.50

Mean (mV)

Peak 1: 22.7

Peak 3: -112

Peak 2: 107

Zeta Potential Distribution

0

Apparent Zeta Potential (mV)

Record 13: HO MeOH Stab 1

Dispersant RI: 1.330

Zeta Runs: 100

Attenuator: 11

Area (%)

64.1

6.7

5.4

100

St Dev (mV)

200

16.8

12.7

11.4



Sample Details

System

Results

General Notes:

Record Number: 14

Temperature (°C): 25.0

Count Rate (kcps): 2.5

Zeta Potential (mV): -3.01

Zeta Deviation (mV): 134

Conductivity (mS/cm): 2.02

60000

5000

3000

2000

1000

a 4000

Cell Description: Zeta dip cell

Result quality See result quality report

-100

Sample Name: HO MeOH Stab 2

File Name: Au NPs.dts

SOP Name: mansettings.nano

Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872



Dispersant Name: Water

Dispersant Dielectric Constant: 78.5

Measurement Position (mm): 4.50

Mean (mV)

Peak 1: 14.8

Peak 2: -59.1

Peak 3: 112

Zeta Potential Distribution

0

Apparent Zeta Potential (mV)

Record 14: HO MeOH Stab 2

Zetasizer Ver. 7.03 Serial Number : MAL1049730

Dispersant RI: 1.330

Zeta Runs: 100

Attenuator: 11

Area (%)

71.0

6.1

4.0

100

St Dev (mV)

17.8

13.0

8.06





Sample Details Sample Name: HO MeOH Stab 3 SOP Name: mansettings.nano General Notes: File Name: Au NPs.dts Dispersant Name: Water Dispersant RI: 1.330 Record Number: 15 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 Area (%) St Dev (mV) Mean (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 Zeta Potential Distribution 50000 40000 30000 20000 10000 -100 100 200 Apparent Zeta Potential (mV) Record 15: HO MeOH Stab 3

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Zetasizer Ver. 7.03 Serial Number : MAL1049730

Filefalvern Instruments Ltd Reoww.malvern.com

File name: Au NPs.dbs talvern instruments Ltd Record Number: 14 www.malvern.com 18 Sep 2018 11:50:30 Al

200

Zetasizer Ver. 7.03 Serial Number : MAL1049730

File name: Au NPs.dts Record Number: 15 18 Seo 2018 11:50:43 AN

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

Malvern



Malvern



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

File Name:	Au NPs.dts		Dispers	ant Name:	Water	
Record Number:	16		Disp	ersant RI:	1.330	
Date and Time:	Tuesday, Se	ptember 18, 20	18 Viso	cosity (cP):	0.8872	
		Dispersa	nt Dielectric	Constant:	78.5	
System						
Temperature (°C):	25.0		2	Zeta Runs:	12	
Count Rate (kcps):	23.2	Meas	urement Pos	ition (mm):	4.50	
Cell Description:	Zeta dip cell			Attenuator:	11	
Results			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-8.46	Peak 1:	-8.46	100.0		5.55
Zeta Deviation (mV):	5.55	Peak 2:	0.00	0.0		0.00
Conductivity (mS/cm):	2.31	Peak 3:	0.00	0.0		0.00
Result quality	See result	quality repor	t			
		Zeta Potential C	listribution			
60000 T						
50000						
+						
\$ 40000						
5 40000 30000 10			-			
²⁶ 20000						
10000						

-100



Sample Details

System

Results

General Notes:

Record Number: 17

Temperature (°C): 25.0

Count Rate (kcps): 19.2

Zeta Potential (mV): -8.08

Zeta Deviation (mV): 5.91

Conductivity (mS/cm): 2.28

50000

40000

30000

2000

10000

Cell Description: Zeta dip cell

Result quality See result quality report

-100

Sample Name: HO MeOH Unstab 2

SOP Name: mansettings.nano

Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872

File Name: Au NPs.dts



Dispersant Name: Water

Dispersant Dielectric Constant: 78.5

Measurement Position (mm): 4.50

Mean (mV)

Peak 1: -8.08

Peak 2: 0.00

Peak 3: 0.00

Zeta Potential Distribution

o

Apparent Zeta Potential (mV)

Record 17: HO MeOH Unstab 2

Zetasizer Ver. 7.03 Serial Number : MAL1049730

Dispersant RI: 1.330

Zeta Runs: 12

Attenuator: 11

Area (%)

100.0

0.0

0.0

100

St Dev (mV)

5.91

0.00

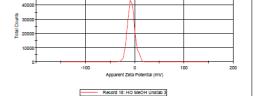
0.00





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 Peak 1: -7.26 100.0 7.38 Zeta Deviation (mV): 7.38 Peak 2: 0.00 0.0 0.00 Conductivity (mS/cm): 2.30 Peak 3: 0.00 0.0 0.00 Result quality See result quality report Zeta Potential Distribution 50000 40000



Malvern Instruments Ltd www.malvern.com Zetanizer Ver. 7.03 Serial Number : MAL1049730

0

Apparent Zeta Potential (mV)

Record 16: HO MeOH Unstab 1

100

200



File Rect 18 S

200

Zetesizer Ver. 7.03 Seriel Number : MAI, 1049730 File name: Au NPs.dts Record Number: 18

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







Sample Details

General Notes:

Sample Name: HO Powder Stab 2

SOP Name: mansettings.nano

File Name: Au NPs.dts





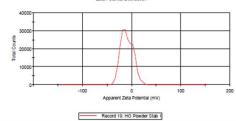
Sample Details



Sample Details

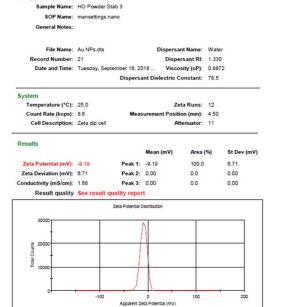
Sample Name: HO Powder Stab 1 SOP Name: mansettings.nano General Notes:

File Name:	Au NPs.dts		Dispersa	nt Name:	Water	
Record Number:	19		Dispe	rsant RI:	1.330	
Date and Time:	Tuesday, Septe	mber 18, 20	18 Visco	sity (cP):	0.8872	
		Dispersa	int Dielectric C	onstant:	78.5	
System						
Temperature (°C):	25.0		Ze	ta Runs:	20	
Count Rate (kcps):	9.4	Measurement Position (mm): 4.50				
Cell Description:	Zeta dip cell	Attenuator: 11				
Results						
			Mean (mV)	Area	(%)	St Dev (mV
7.4.0.4.4.4.4.4.4.	-9.47	Peak 1:	-9.47	100.0		12.4
Zeta Potential (mV):		Peak 2:	0.00	0.0		0.00
Zeta Potential (mV): Zeta Deviation (mV):	12.4	Peak Z:	0.00	0.0		
		Peak 2: Peak 3:		0.0		0.00



Record Number:	20		Di	spersant RI:	1.330	
Date and Time:	Tuesday, Septe	mber 18, 20	018 Vi	scosity (cP):	0.8872	
		Dispersa	ant Dielectri	c Constant:	78.5	
System						
Temperature (°C):	25.0			Zeta Runs:	12	
Count Rate (kcps):	10.4	Meas	surement Po	sition (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 qu	ality repor	t			
		Zeta Potential C	Distribution			
30000						
Ļ			٨			
# 20000						
5000						
Courts 20000		1				
F 10000						

Dispersant Name: Water



Record 21: HO Powder Stab 3



Record 20: HO Powder Stab 2

0

Apparent Zeta Potential (mV)

100

200

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

-100



General Notes:

Record Number: 22

Temperature (°C): 25.0

Cell Description: Zeta dip cell

Result quality See result quality report

-100

Count Rate (kcps): 6.4

Zeta Potential (mV): -4.14

Zeta Deviation (mV): 0.58

Conductivity (mS/cm): 2.01

60000

50000

4000

3000

20000

1000

Sample Name: HO Powder Unstab 1

SOP Name: mansettings.nano

Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872

File Name: Au NPs.dts

Sample Details

System

Results



Dispersant Name: Water

Dispersant Dielectric Constant: 78.5

Measurement Position (mm): 4.50

Mean (mV)

Peak 1: -4.14

Peak 2: 0.00

Peak 3: 0.00

Zeta Potential Distribution

Apparent Zeta Potential (mV)

Record 22: HO Powder Unstab 1

Dispersant RI: 1.330

Zeta Runs: 28

Attenuator: 11

Area (%)

100.0

0.0

0.0

100

St Dev (mV)

200

6.58

0.00

0.00



Sample Details

System

Results

General Notes:

Record Number: 23

Temperature (°C): 25.0

Cell Description: Zeta dip cell

Result quality See result quality report

Count Rate (kcps): 7.8

Zeta Potential (mV): -4.22

Zeta Deviation (mV): 7.39

Conductivity (mS/cm): 2.03

200000

15000

10000

50000

Sample Name: HO Powder Unstab 2

SOP Name: mansettings.nano

Date and Time: Tuesday, September 18, 2018 ... Viscosity (cP): 0.8872

File Name: Au NPs.dts



Dispersant Name: Water

Dispersant Dielectric Constant: 78.5

Measurement Position (mm): 4.50

Mean (mV)

Peak 1: -4.22

Peak 2: 0.00

Peak 3: 0.00

Zeta Potential Distribution

0

Apparent Zeta Potential (mV)

Record 23: HO Powder Unstab 2

Dispersant RI: 1.330

Zeta Runs: 78

Attenuator: 11

Area (%)

100.0

0.0

0.0

100

St Dev (mV)

200

7.39

0.00

0.00





Sample Details

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

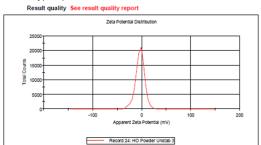
 File Name:
 Au NPs.dts
 Dispersant Name:
 Water

 Record Number:
 24
 Dispersant RI:
 1.330

 Date and Time:
 Tuesday. September 18, 2019...
 Viscosity (cP):
 0.8872

Dispersant Dielectric Constant: 78.5

System						
Temperature (°C):	25.0		Ze	12		
Count Rate (kcps):	5.5	Measurement Position (mm):			4.50	
Cell Description:	Zeta dip cell		At	11		
Results						
			Mean (mV)	Area (%)	St Dev (mV
Zeta Potential (mV):	-3.54	Peak 1:	-3.54	100.0		9.26
Zeta Deviation (mV):	9.26	Peak 2:	0.00	0.0		0.00
Conductivity (mS/cm):	2.00	Peak 3:	0.00	0.0		0.00



laiven instruments Ltd www.maivem.com	Zetanizer Vet. 7.03 Serial Number : MAL1049730	File name: Au Record Nam&Wern Instruments Ltd 18 Sep 2018 //ww.malvem.com	Zetenizer Ver. 7.03 Serial Number : MAL1049730	pylvem induments Ltd Ryfw.malvem.com	Zetanizer Ver. 7.05 Serial Number : MAL1040750	File name: Au NPa.dta Record Number: 24 18 Record Namber: 24

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

-100

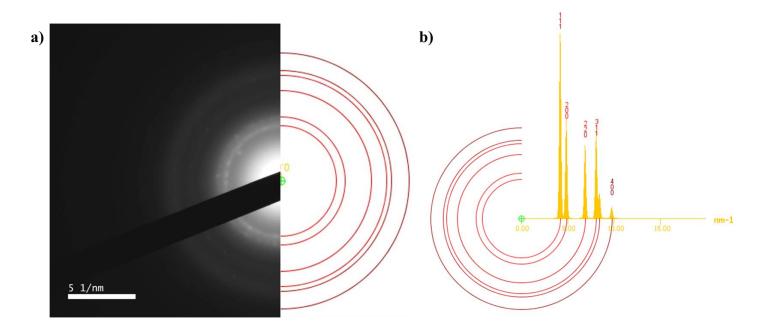


Figure 9: a) Sherrer ring patterns matching b) the gold standard for face centred cubic crystal structure