**Supplementary Figure 1.**



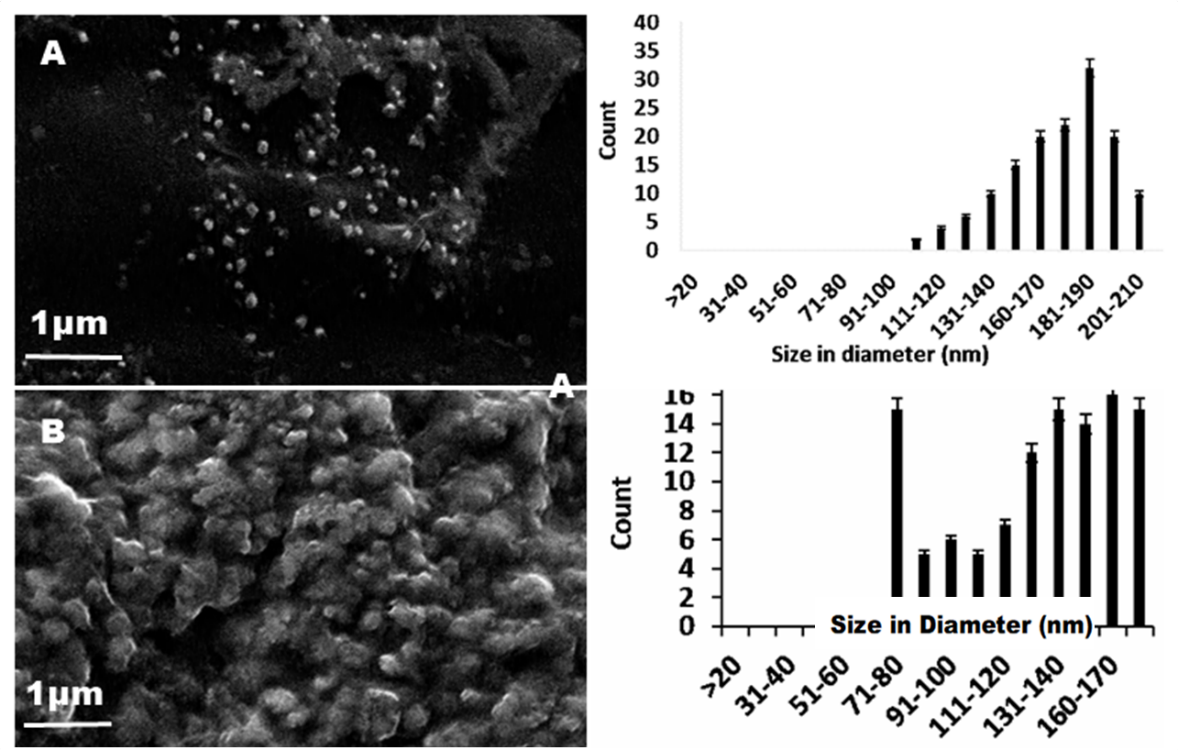
**Supplementary Figure 2.**



**Supplementary Figure 3.**



**Supplementary Figure 4.**



**Table 1 Report Summarizes the adjusted and predicted values; Cook’s distance; residual values for the model designed.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Report of AuNp synthesis experimental design | | | | | | | | | | | | | | | | |
| Run Order | | Actual Value | Predicted Value⁽¹⁾ | | Residual | Leverage | Internally Studentized Residuals | | Externally Studentized Residuals | | Cook's Distance | Influence on Fitted Value DFFITS | | Standard Order | |
| 1 | | 533.00 | 534.50 | | -1.50 | 0.706 | -0.549 | | -0.527 | | 0.066 | -0.816 | | 4 | |
| 2 | | 553.00 | 550.71 | | 2.29 | 0.706 | 0.838 | | 0.823 | | 0.153 | 1.274 | | 2 | |
| 3 | | 549.00 | 551.12 | | -2.12 | 0.706 | -0.777 | | -0.759 | | 0.132 | -1.175 | | 7 | |
| 4 | | 550.00 | 539.42 | | 10.58 | 0.194 | 2.345 | | 3.543 | | 0.121 | 1.741 | | 10 | |
| 5 | | 541.00 | 539.42 | | 1.58 | 0.194 | 0.351 | | 0.333 | | 0.003 | 0.164 | | 11 | |
| 6 | | 545.00 | 545.15 | | -0.1495 | 0.706 | -0.055 | | -0.052 | | 0.001 | -0.080 | | 6 | |
| 7 | | 548.00 | 548.43 | | -0.4342 | 0.706 | -0.159 | | -0.150 | | 0.006 | -0.233 | | 8 | |
| 8 | | 534.00 | 532.34 | | 1.66 | 0.706 | 0.610 | | 0.588 | | 0.081 | 0.910 | | 5 | |
| 9 | | 550.00 | 549.40 | | 0.6005 | 0.706 | 0.220 | | 0.208 | | 0.011 | 0.322 | | 1 | |
| 10 | | 534.00 | 539.42 | | -5.42 | 0.194 | -1.200 | | -1.234 | | 0.032 | -0.606 | | 9 | |
| 11 | | 549.00 | 548.68 | | 0.3158 | 0.706 | 0.116 | | 0.109 | | 0.003 | 0.169 | | 3 | |
| 12 | | 532.00 | 539.42 | | -7.42 | 0.194 | -1.643 | | -1.851 | | 0.059 | -0.910 | | 12 | |
| 13 | | 534.00 | 534.93 | | -0.9330 | 0.679 | -0.328 | | -0.311 | | 0.021 | -0.452 | | 17 | |
| 14 | | 533.00 | 532.30 | | 0.6978 | 0.679 | 0.245 | | 0.232 | | 0.012 | 0.337 | | 18 | |
| 15 | | 546.00 | 546.19 | | -0.1942 | 0.679 | -0.068 | | -0.064 | | 0.001 | -0.094 | | 13 | |
| 16 | | 537.00 | 536.65 | | 0.3528 | 0.250 | 0.081 | | 0.076 | | 0.000 | 0.044 | | 19 | |
| 17 | | 543.00 | 545.54 | | -2.54 | 0.679 | -0.891 | | -0.880 | | 0.153 | -1.280 | | 15 | |
| 18 | | 537.00 | 536.65 | | 0.3528 | 0.250 | 0.081 | | 0.076 | | 0.000 | 0.044 | | 20 | |
| 19 | | 545.00 | 545.04 | | -0.0411 | 0.679 | -0.014 | | -0.014 | | 0.000 | -0.020 | | 14 | |
| 20 | | 550.00 | 547.70 | | 2.30 | 0.679 | 0.808 | | 0.791 | | 0.126 | 1.152 | | 16 | |
| Report of SeNp synthesis experimental design | | | | | | | | | | | | | | | | |
| Run Order | Actual Value | | Predicted Value | Residual | | Leverage | | Internally Studentized Residuals | Externally Studentized Residuals | Cook's Distance | | | Influence on Fitted Value DFFITS | | Standard Order |
| 1 | 284.00 | | 283.54 | 0.4638 | | 0.166 | | 0.082 | 0.077 | 0.000 | | | 0.035 | | 16 |
| 2 | 296.00 | | 298.54 | -2.54 | | 0.670 | | -0.710 | -0.691 | 0.102 | | | -0.985 | | 8 |
| 3 | 276.00 | | 272.91 | 3.09 | | 0.607 | | 0.792 | 0.776 | 0.097 | | | 0.965 | | 13 |
| 4 | 284.00 | | 285.83 | -1.83 | | 0.607 | | -0.468 | -0.449 | 0.034 | | | -0.558 | | 14 |
| 5 | 280.00 | | 283.54 | -3.54 | | 0.166 | | -0.622 | -0.602 | 0.008 | | | -0.269 | | 17 |
| 6 | 284.00 | | 283.54 | 0.4638 | | 0.166 | | 0.082 | 0.077 | 0.000 | | | 0.035 | | 20 |
| 7 | 268.00 | | 268.03 | -0.0340 | | 0.670 | | -0.009 | -0.009 | 0.000 | | | -0.013 | | 5 |
| 8 | 276.00 | | 283.54 | -7.54 | | 0.166 | | -1.325 | -1.384 | 0.035 | | | -0.618 | | 19 |
| 9 | 242.00 | | 244.59 | -2.59 | | 0.607 | | -0.664 | -0.645 | 0.068 | | | -0.802 | | 9 |
| 10 | 279.00 | | 283.54 | -4.54 | | 0.166 | | -0.798 | -0.782 | 0.013 | | | -0.349 | | 18 |
| 11 | 280.00 | | 284.81 | -4.81 | | 0.670 | | -1.345 | -1.410 | 0.367 | | | -2.008 | | 2 |
| 12 | 272.00 | | 268.08 | 3.92 | | 0.670 | | 1.095 | 1.108 | 0.243 | | | 1.577 | | 7 |
| 13 | 301.00 | | 300.00 | 1.00 | | 0.670 | | 0.280 | 0.267 | 0.016 | | | 0.380 | | 6 |
| 14 | 298.00 | | 294.14 | 3.86 | | 0.607 | | 0.988 | 0.987 | 0.151 | | | 1.227 | | 10 |
| 15 | 266.00 | | 267.90 | -1.90 | | 0.670 | | -0.530 | -0.510 | 0.057 | | | -0.727 | | 3 |
| 16 | 294.00 | | 294.86 | -0.8601 | | 0.670 | | -0.240 | -0.229 | 0.012 | | | -0.326 | | 4 |
| 17 | 298.00 | | 283.54 | 14.46 | | 0.166 | | 2.543 | 4.059 | 0.129 | | | 1.813 | | 15 |
| 18 | 258.00 | | 256.35 | 1.65 | | 0.670 | | 0.460 | 0.441 | 0.043 | | | 0.629 | | 1 |
| 19 | 296.00 | | 295.61 | 0.3893 | | 0.607 | | 0.100 | 0.095 | 0.002 | | | 0.118 | | 12 |
| 20 | 288.00 | | 287.12 | 0.8751 | | 0.607 | | 0.224 | 0.213 | 0.008 | | | 0.265 | | 11 |

**Table 2 Cryopreservation of nanoparticles and their Stability**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Method | Absorbance (nm) | | | | | | Ease of handling |
| Control | Glycine | Tween 20 | | Dextrose | PEG4K  PEG6K |  |
| Temperature | a/b/c | a/b/c | a/b | c | a/b/c | a/b/c | * Requires minimum processing * Easy freeze thaw cycles |
| Suspension  AuNp  SeNp | ̴ 540  ̴290 | ̴ 530  ̴290 | ̴530  ̴290 | ̴550  ̴320 | ̴ 550  ̴300 | aggregate |
| Centrifuged  AuNp  SeNp | ̴550  ̴320 | ̴550  ̴320 | ̴550  ̴320 | | ̴ 550  ̴300 | aggregate | * Extra step of centrifugation needed |
| Drying  AuNp  SeNp | ̴550  ̴320 | ̴550  ̴320 | ̴550  ̴320 | | ̴ 550  ̴300 | aggregate | * Drying is required, followed by -20 ºC storage |

\* a = 4 ºC, b = -20 ºC, c = -80 ºC