Electronic Supplementary Material (ESI) for Analytical Methods.


# Detection of Mercury (II) ions in aqueous solution using Silver nanorods as a probe

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**Supplementary Information**

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**Results**

**Figure S1:** UV-visible spectra of five different batches of synthesized SNRs

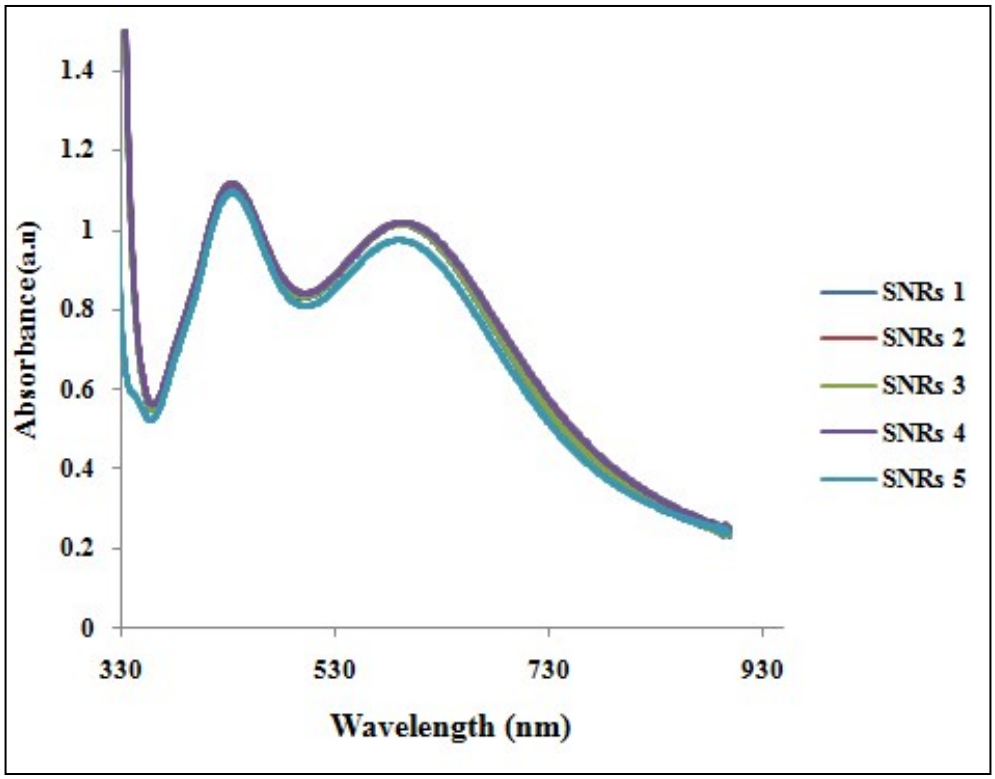

**Table S1**: Wavelength and absorbance values for five different batches of as-synthesized SNRs

| SNRs | Wavelength ($\lambda_{max}$) (nm) | | Absorbance (a.u) | |
|---|---|---|---|---|
| | **TSPR** | **LSPR** | **TSPR** | **LSPR** |
| Batch 1 | 433 | 586 | 0.111 | 0.101 |
| Batch 2 | 434 | 586 | 0.110 | 0.101 |
| Batch 3 | 434 | 589 | 0.11 | 0.101 |
| Batch 4 | 435 | 589 | 0.111 | 0.101 |
| Batch 5 | 432 | 585 | 0.108 | 0.100 |
| Mean | 433.6±0.50 | 587±0.83 | 0.110±0.001 | 0.101±0 |
| RSD% | 0.262 | 0.318 | 1.273 | 0.672 |

**Table S2:** Optimization of DTT concentration

| Concentration of DTT (mM) | Absorbance ratio ($A/A_0$) |
|---|---|
| 0.02 | 0.814815 |
| 0.03 | 0.744444 |
| 0.05 | 0.755556 |
| 0.09 | 0.759259 |

A - Absorbance of interacted SNRs at $\lambda_{585}$ nm

$A_0$ - Absorbance of un-interacted SNRs at $\lambda_{585}$ nm

**Table S3:** Effect of pH of SNRs on the absorption ratio at the range of $Hg^{2+}$ ions concentration (1, 10 and 100 pM) in presence of DTT

| pH of SNRs | Concentration of $Hg^{2+}$ ions | | |
|---|---|---|---|
| | 1 pM | 10 pM | 100 pM |
| 4 | 0.874539 | 0.915129 | 0.96679 |
| 5 | 0.867159 | - | - |
| 6 | - | - | - |
| 7 | - | - | - |

"-" No reaction

**Table S4:** Effect of SNRs/DTT/$Hg^{2+}$ ions interaction volumes on the absorption ratio

| Volume of SNRs | Volume of DTT | Volume of $Hg^{2+}$ ions | Concentration of $Hg^{2+}$ ions | | | $R^2$ |
|---|---|---|---|---|---|---|
| | | | 5 pM | 15 pM | 30 pM | |
| 400 | 400 | 200 | 0.822222 | 0.811111 | 0.825926 | 0.51 |
| 400 | 300 | 300 | 0.859259 | 0.866667 | 0.888889 | 0.97 |
| 400 | 200 | 400 | 0.785185 | 0.792593 | 0.796296 | 0.907 |

A - Absorbance of interacted SNRs at $\lambda_{585}$ nm

$A_0$ - Absorbance of un-interacted SNRs at $\lambda_{585}$ nm

$R^2$ - The correlation coefficient of determinant

**Figure S2:** UV-visible spectra of five different batches of SNRs before and after interaction with 1, 10 and 100 pM concentration of $Hg^{2+}$ ions in presence of DTT (0.03 mM)

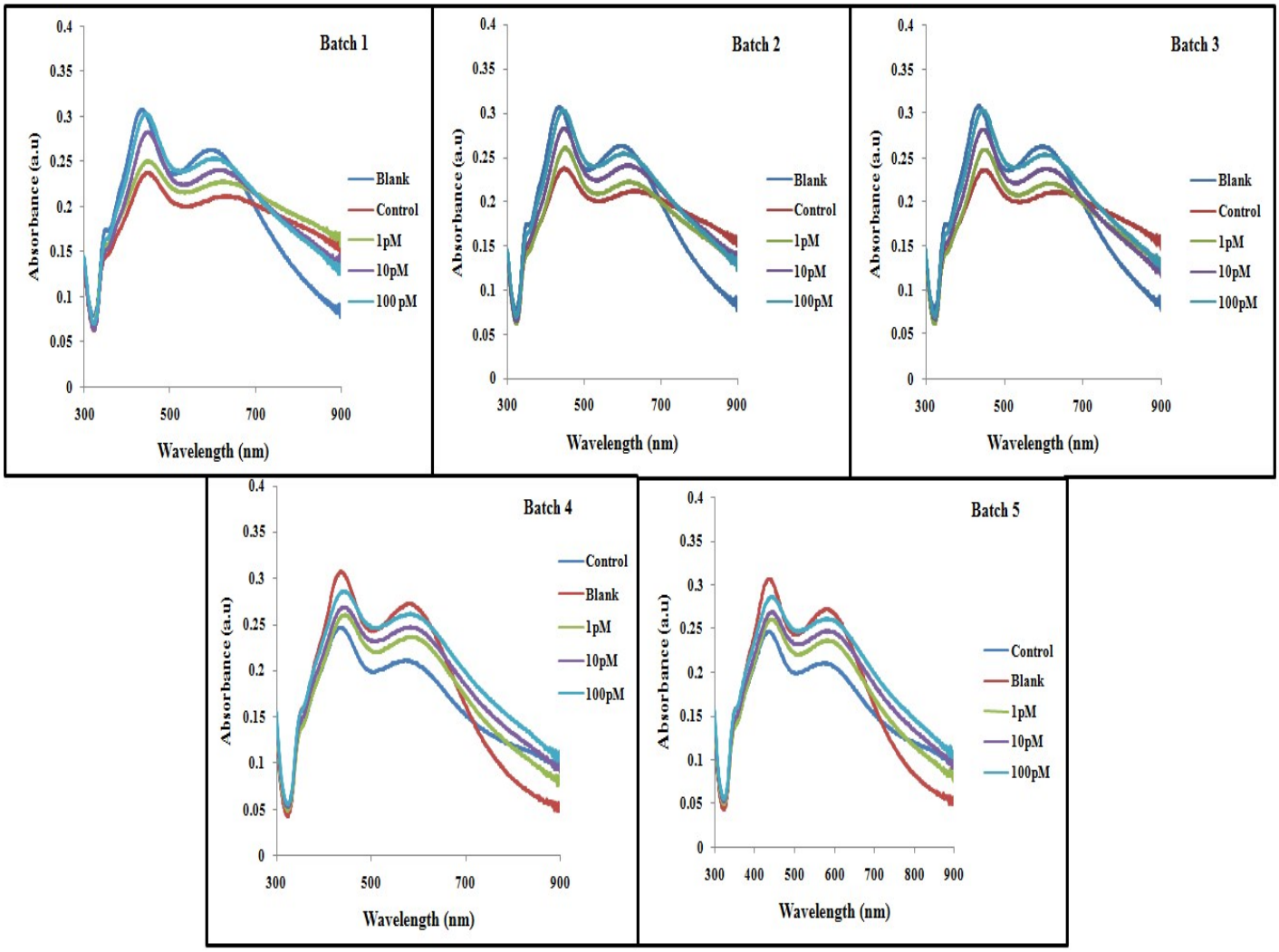


**Table S5:** $Hg^{2+}$ ion detection study by five different batches of SNRs to confirm the repetition of the proposed method

| $Hg^{2+}$ Con (pM) | Batch 1 | Batch 2 | Batch 3 | Batch 4 | Batch 5 | Mean | RSD% |
|---|---|---|---|---|---|---|---|
| 1 | 0.866 | 0.874 | 0.901 | 0.882 | 0.898 | 0.884±0.006 | 1.694 |
| 10 | 0.911 | 0.892 | 0.935 | 0.928 | 0.943 | 0.922±0.009 | 2.204 |
| 100 | 0.963 | 0.977 | 1 | 1.003 | 0.981 | 0.985±0.007 | 1.700 |