Supporting figures/tables

Figure S1

(a)

Fig. S1 (a) FTIR spectrum of the complete gold nanosensor, Au-TA-DNS; peaks at $\nu_{\text{NH}} = 3219 \text{ cm}^{-1}$, $\nu_{\text{CO}} = 1643 \text{ cm}^{-1}$ corresponds to the stretching vibration of –NH and –C=O respectively.

(b)

FTIR spectrum of metal bound Au-TA-DNS, peaks at $\nu_{\text{NH}}$ at 3219 cm$^{-1}$ and the red shift of the carbonyl $\nu_{\text{CO}}$ to 1586 cm$^{-1}$ indicate that the carbonyl O-atom and hydrazine N-atom are the coordination sites.
Figure S2: UV-vis spectra of gold nanosensor Au-TA-DNS at pH~8, pH~4 and 1% NaCl showing stability at various conditions.
**Fig S3** Fluorescence spectrum of dansylhydrazine in presence of lead and copper ions. Dansylhydrazine alone did not show any change in fluorescence intensity when metal ions are added.
Figure S4: UV-Vis spectra showing Au-TA-DNS with various concentrations of Cu$^{2+}$ ions.
Figure S5: Image showing straight paper strips assay with Au-TA-DNS and 10ppm of various metal ions. No bluish black color formation was observed with these metal ions indicating the specific selectivity towards Pb(II) and Cu(II).
Table S1

<table>
<thead>
<tr>
<th>CONSTRUCT</th>
<th>Citrate-AuNP</th>
<th>Au-TA</th>
<th>Au-TA-DNS</th>
<th>Au-TA-DNS with Lead(II) Ion</th>
<th>Au-TA-DNS with Copper (II) ion</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE (nm)</td>
<td>44±0.7</td>
<td>56±3.5</td>
<td>71±1.2</td>
<td>126±4.4</td>
<td>114±3.5</td>
</tr>
<tr>
<td>CHARGE (mV)</td>
<td>-24.4</td>
<td>-31.3</td>
<td>-38.2</td>
<td>-37.0</td>
<td>-28.4</td>
</tr>
</tbody>
</table>

*Table S1: Hydrodynamic size and surface charge measurements at different chemical modification steps and after addition of metal ions Pb^{2+} and Cu^{2+}.*