Supporting information

Luminescent, Freestanding Composite Films of Au$_{15}$ for Specific Metal Ion Sensing

Anu George,† E. S. Shibu,† Shihabudheen M. Maliyekkal,†,‡ M. S. Bootharaju,† and T. Pradeep*,†

†DST Unit of Nanoscience (DST UNS), Department of Chemistry, Indian Institute of Technology, Madras, Chennai 600 036, India

‡School of Mechanical and Building Sciences, VIT University, Chennai Campus, Chennai-600 048, India

*Email: pradeep@iitm.ac.in (T. Pradeep)
**Supporting information 1**

![Intensity vs Wavelength Graph](image)

**Figure S1.** Excitation and emission spectra of Au$_{15}$ solution. Inset shows the photograph of Au$_{15}$ in solution phase under visible light. A photograph in UV light is given in Figure 3.
Supporting information 2

Figure S2. Photoluminescence spectra of parent chitosan film with and without Cu$^{2+}$ ion (5 ppm). Peaks in UV and visible regions correspond to excitation and emission, respectively. The feature indicated with (*) is due to an unidentified impurity.
**Supporting information 3**

![EDAX spectrum of the composite film exposed to CuCl₂. Inset shows the SEM and EDAX image of the composite film which shows uniform elemental distribution of copper, gold, sulfur and chlorine in the exposed composite film.](image)

**Figure S3.** EDAX spectrum of the composite film exposed to CuCl₂. Inset shows the SEM and EDAX image of the composite film which shows uniform elemental distribution of copper, gold, sulfur and chlorine in the exposed composite film.
Supporting information 4

Figure S4. XP spectrum of Au$_{15}$@SG-βCD+Hg$^{2+}$ sample in Hg 4f region. A peak corresponds to Au 5s is noticed whereas no Hg 4f feature is seen.
**Supporting information 5**

![Photoluminescence spectra](image)

**Figure S5.** Photoluminescence spectra of the composite film exposed to different salts of Cu$^{2+}$ ion in 1 ppm concentration. Peaks in UV and visible regions correspond to excitation and emission, respectively. Chloride, sulphate, acetate salts of copper shows a similar shift in their emission wavelength. The feature indicated with (*) is due to an unidentified impurity.
**Supporting information 6**

**Figure S6.** A comparison of the photoluminescence spectra of the composite film with chloride salt of Cu$^{2+}$ and Cu$^{1+}$ metal ions at 1 ppm concentration. Peaks in UV and visible regions correspond to excitation and emission, respectively. The feature indicated with (*) is due to an unidentified impurity.