

# Supporting information

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

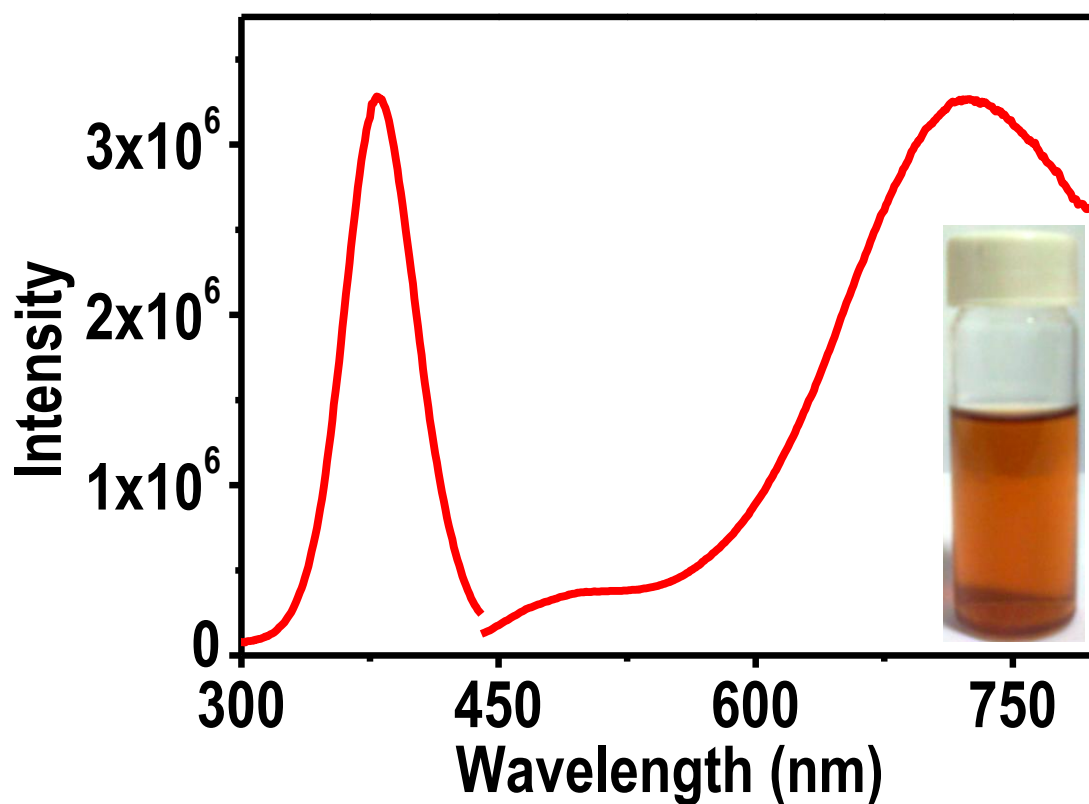
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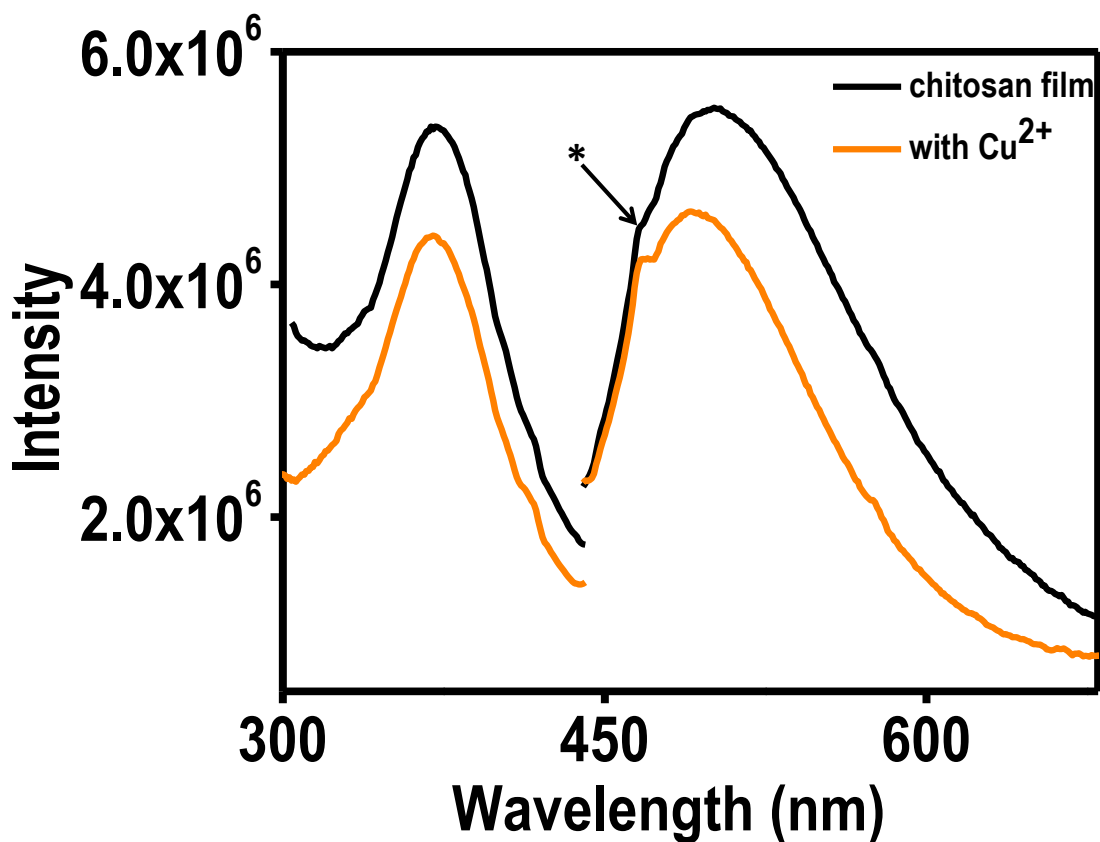
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## Supporting information 1



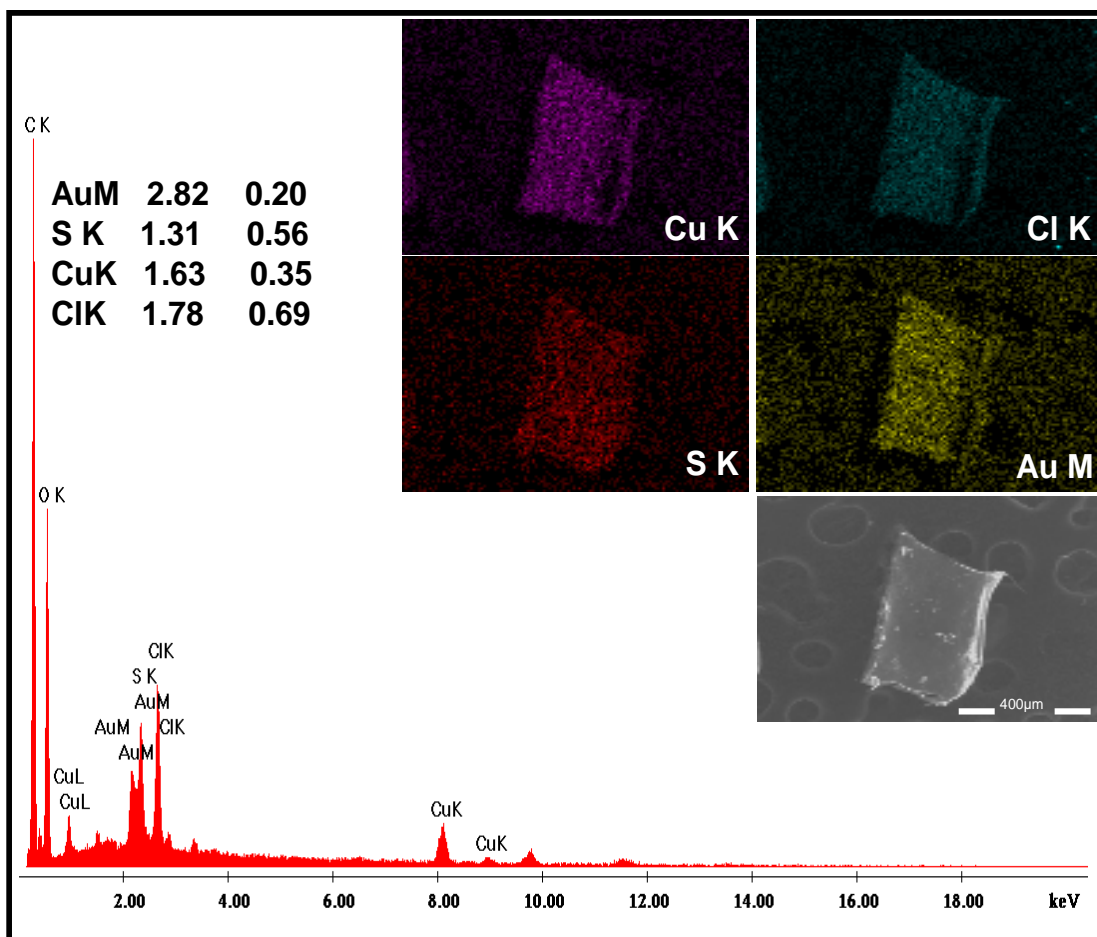
**Figure S1.** Excitation and emission spectra of Au<sub>15</sub> solution. Inset shows the photograph of Au<sub>15</sub> in solution phase under visible light. A photograph in UV light is given in Figure 3.

## Supporting information 2



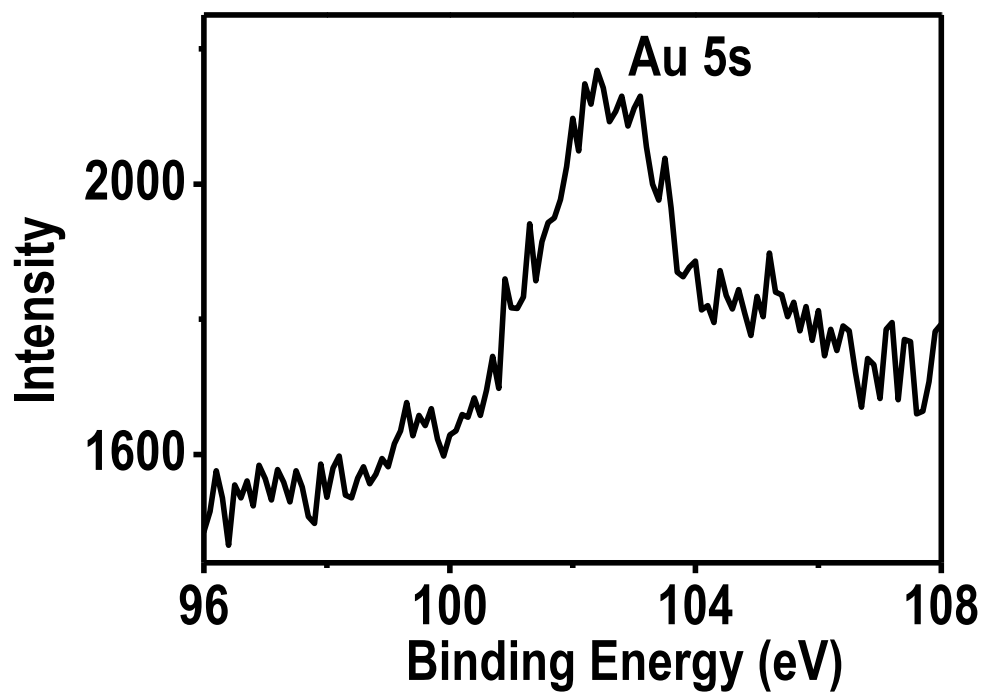
**Figure S2.** Photoluminescence spectra of parent chitosan film with and without Cu<sup>2+</sup> ion (5 ppm). Peaks in UV and visible regions correspond to excitation and emission, respectively. The feature indicated with (\*) is due to an unidentified impurity.

### Supporting information 3



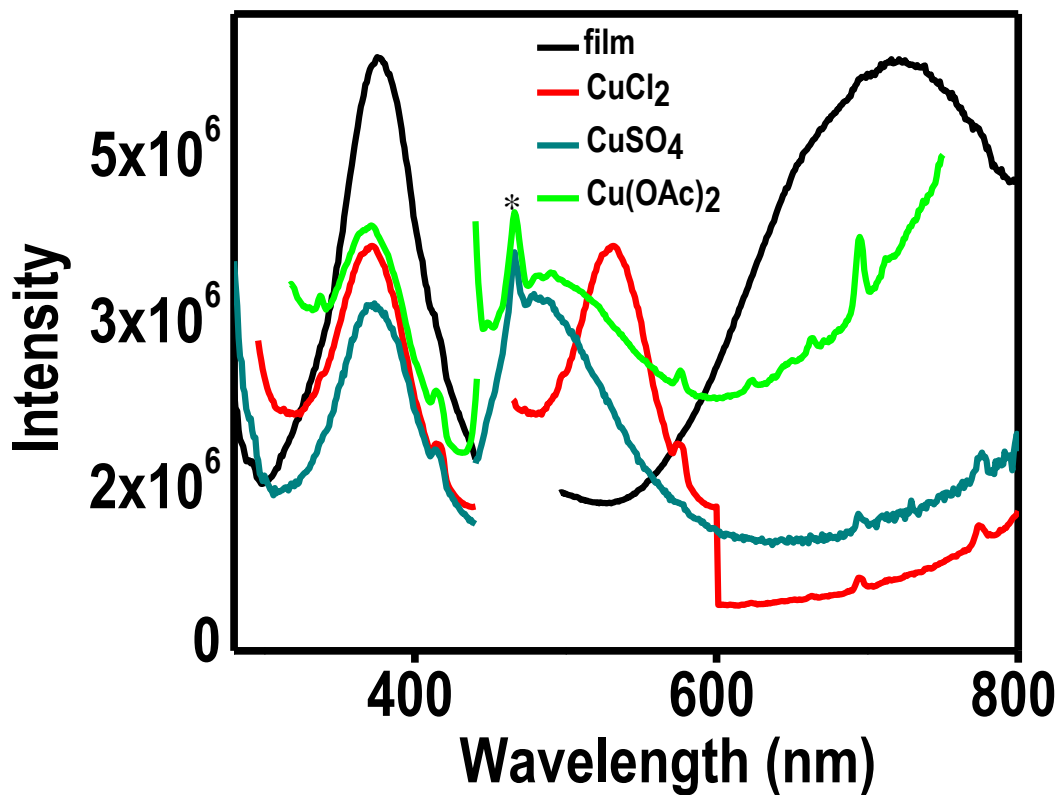
**Figure S3.** EDAX spectrum of the composite film exposed to  $\text{CuCl}_2$ . Inset shows the SEM and EDAX image of the composite film which shows uniform elemental distribution of copper, gold, sulfur and chlorine in the exposed composite film.

## Supporting information 4



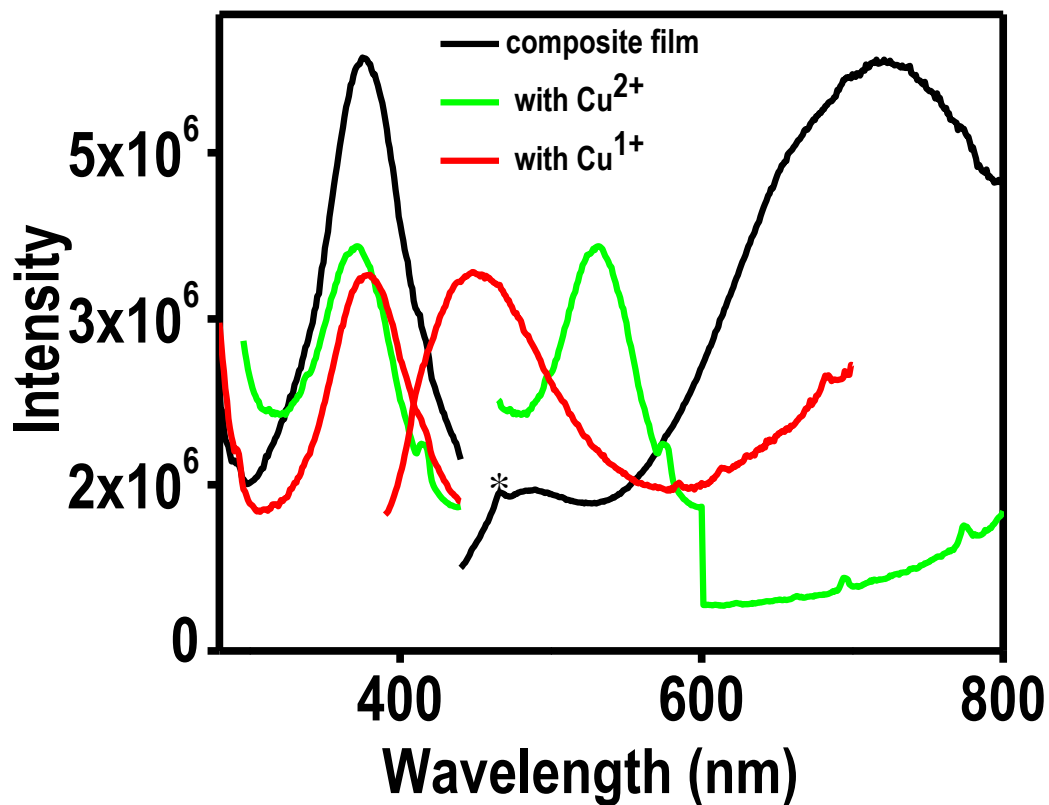
**Figure S4.** XP spectrum of Au<sub>15</sub>@SG-βCD+Hg<sup>2+</sup> sample in Hg 4f region. A peak corresponds to Au 5s is noticed whereas no Hg 4f feature is seen.

## Supporting information 5



**Figure S5.** Photoluminescence spectra of the composite film exposed to different salts of  $\text{Cu}^{2+}$  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  $\text{Cu}^{2+}$  and  $\text{Cu}^{1+}$  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.