

Electronic Supplementary Material (ESI) for RSC Advances.  
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*Rhodamine B derivative-modified up-conversion nanoparticle probe based on fluorescence resonance energy transfer (FRET) for solid-based detection of copper ion*

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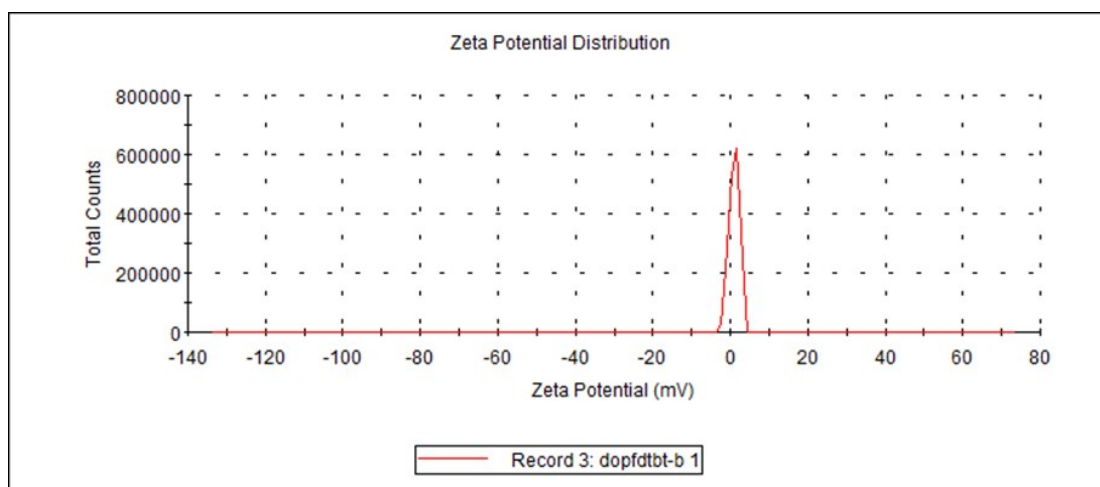
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## Supplementary Information



**Fig. S1**  $\zeta$ -potential of the RBH

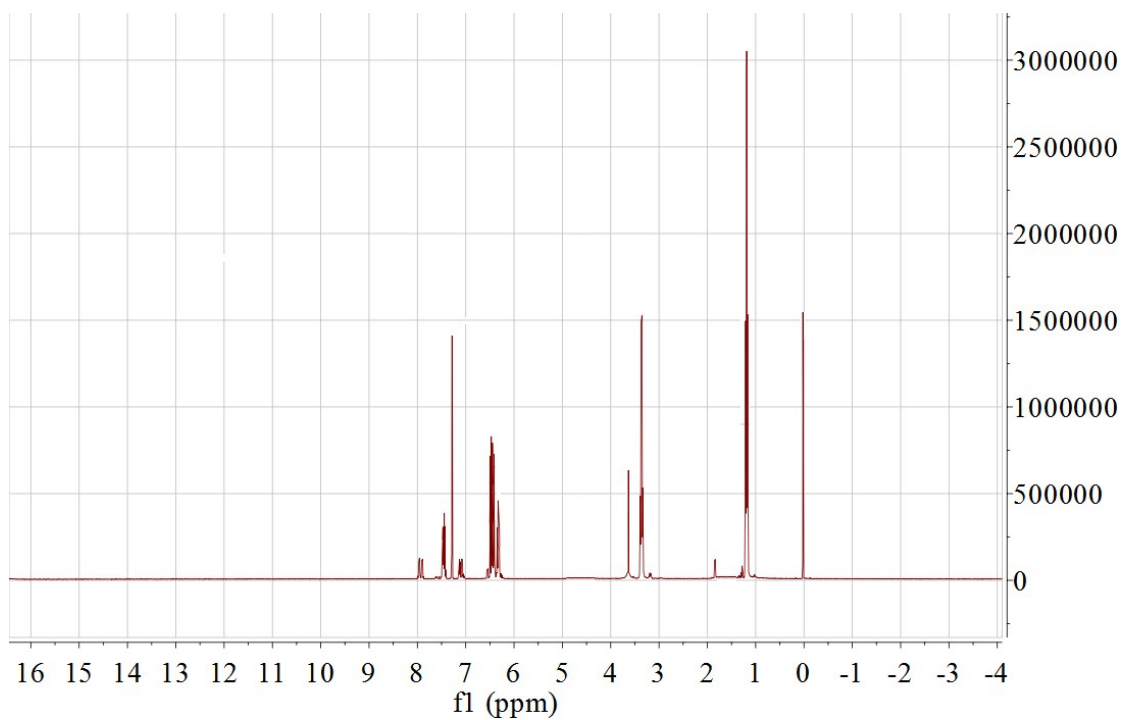


Fig. S2 <sup>1</sup>H NMR spectra of the RBH.

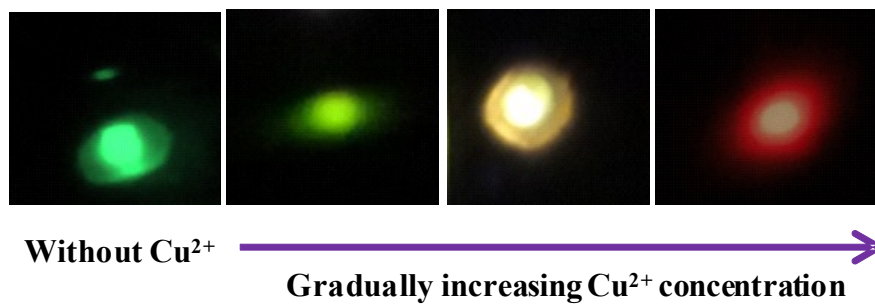


Fig. S3 color change of the RBH-UCNPs FRET sensors with increasing  $\text{Cu}^{2+}$  concentration.

The arrow represents the direction of increasing concentration.

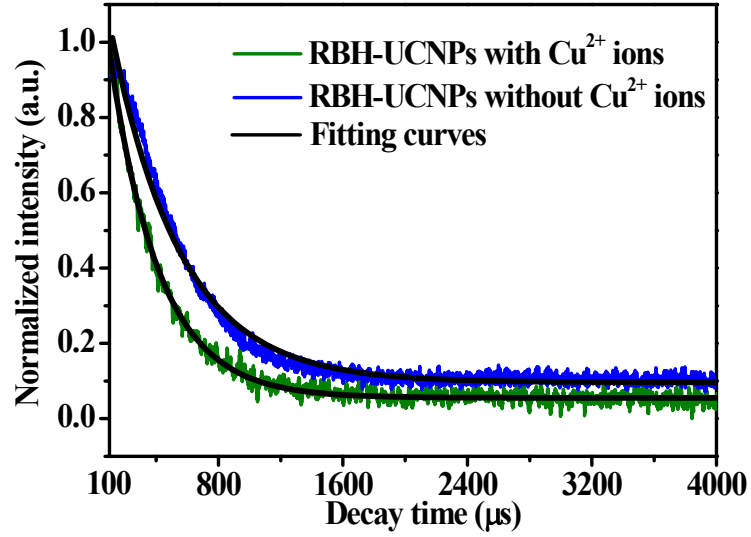


Fig.S4 Luminescent decay dynamic of  $^4S_{3/2} - ^4I_{15/2}$  of  $Er^{3+}$  transition in the absence and presence of  $Cu^{2+}$  ions. The black solid line is fitting curves, other curves are the measured data.

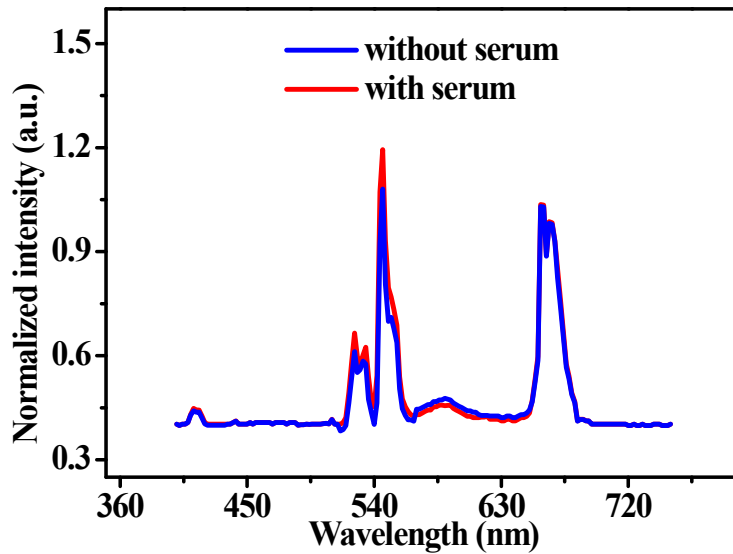


Fig. S5 Fluorescence intensity comparison in the absence and presence of the serum with the addition of the  $Cu^{2+}$  ions.