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**Supporting information** 

## Conjugation-induced fluorescent labelling of mesoporous silica nanoparticles for the sensitive and selective detection of copper ions in aqueous solution

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**Fig. S1** <sup>1</sup>H NMR of BM (in CDCl<sub>3</sub>).



**Fig. S2** TEM image with more MSNs (left); the size distribution histogram of the synthesized MSNs (right) and the black Gauss fitting curve to illustrate their mean particle size.



**Fig. S3** The absorption spectra in HEPES solution (50 mM; pH = 7.4) of the synthesized (a) MSNs, (b) MSNs-NH<sub>2</sub> and (c) MSNs-NM.



**Fig. S4** TGA curves of the synthesized (a)  $MSNs-NH_2$  and (b) MSNs-NM. The difference of mass loss in the TGA curves for  $MSNs-NH_2$  and MSNs-NM was about 9.1%. This value corresponded to the elimination of fluorescent probe. The content of fluorescent probe introduced into MSNs was determined to be 0.1 g per gram of MSNs.



**Fig. S5** Fluorescence spectra of MSNs-NM (30 mg L<sup>-1</sup>) suspension in HEPES solution (50 mM; pH = 7.4) in the presence of various metal ions (150  $\mu$ M) ( $\lambda ex = 371$  nm).



**Fig. S6** Fluorescence response of MSNs-NM (30 mg L<sup>-1</sup>) in HEPES solution (50 mM; pH = 7.4) to various metal ions (150  $\mu$ M) in the presence of Cu<sup>2+</sup> (150  $\mu$ M) ( $\lambda_{ex}$  = 371 nm,  $\lambda_{em}$  = 505 nm).



**Fig. S7** Time titration profile for MSNs-NM (30 mg L<sup>-1</sup>) in HEPES solution (50 mM; pH = 7.4) upon the addition of 30  $\mu$ M Cu<sup>2+</sup> ions with the time variation from 0 to 120 seconds.