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Selective Fluorescent Sensing of Hg^{2+} and Zn^{2+} Ions through Dual Independent Channel Based on the Site-Specific Functionalization of Mesoporous Silica Nanoparticles†

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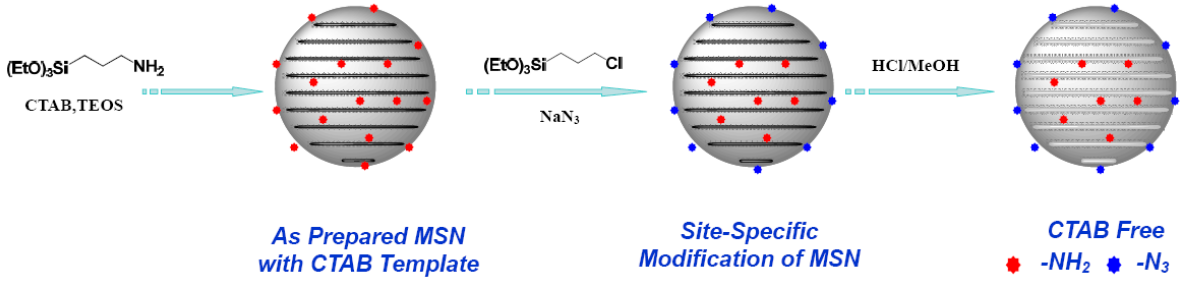
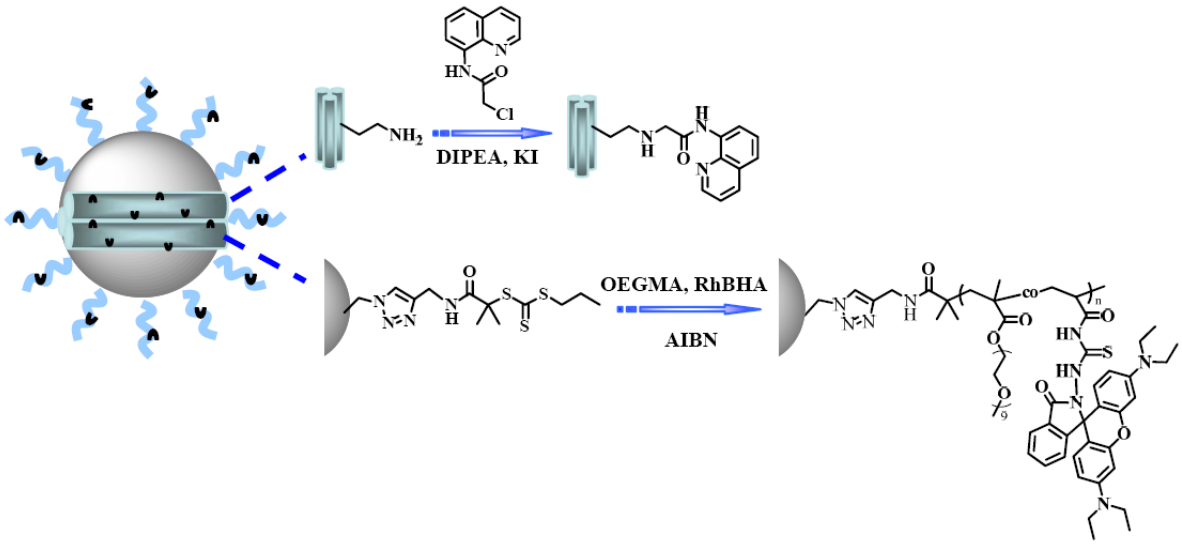


Scheme S1. Schematic illustration for the preparation of N_3-MSN(NH_2).



Scheme S2. Detailed procedures for the preparation of P(OEGMA-*co*-RhBHA) coated MSN with CQA in the inner surface.

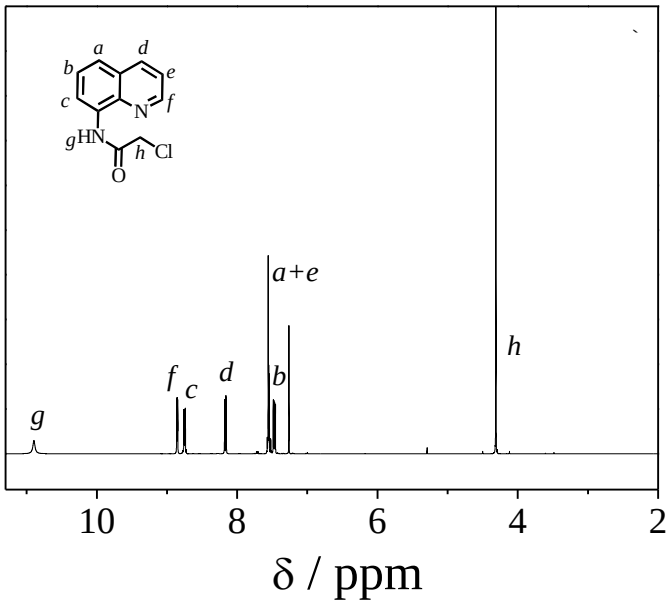


Figure S1. ^{1}H NMR spectrum obtained for CQA in $CDCl_3$.

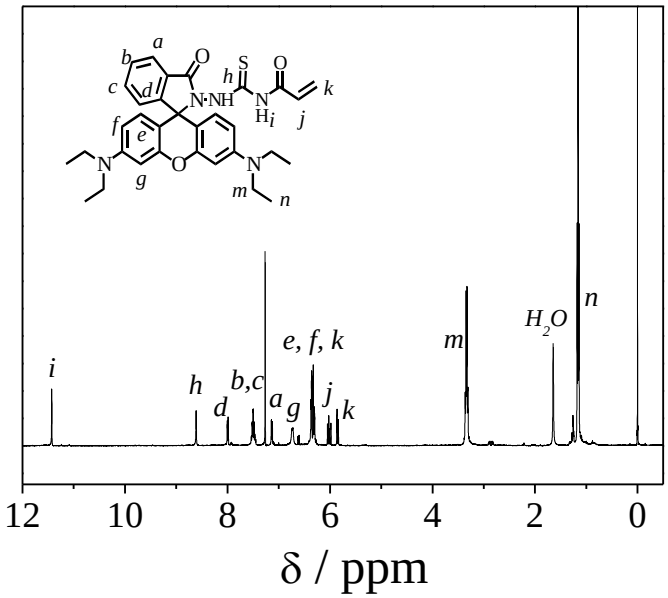


Figure S2. ^{1}H NMR spectrum obtained for RhBHA in $CDCl_3$.

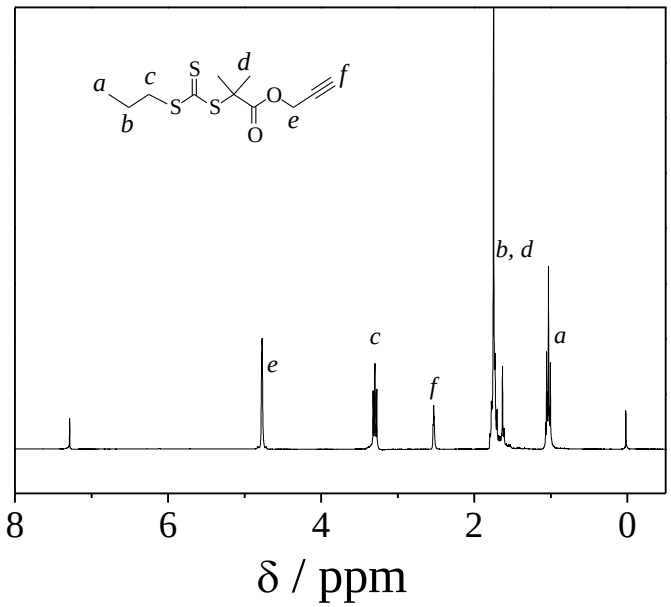


Figure S3. ^{1}H NMR spectrum obtained for *alkynyl*-functionalized RAFT agent PDMAT in $CDCl_3$.

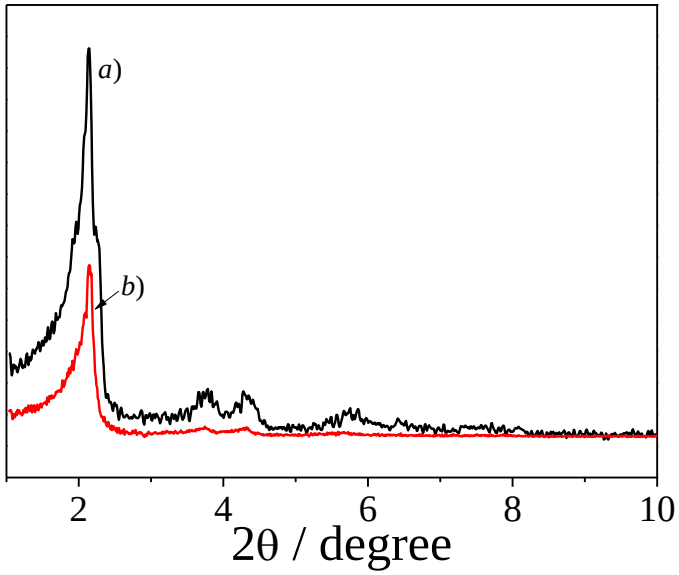


Figure S4. XRD of (a) N_3-MSN(NH_2), and (b) P(OEGMA-*co*-RhBHA) coated MSN with CQA in the inner surface.

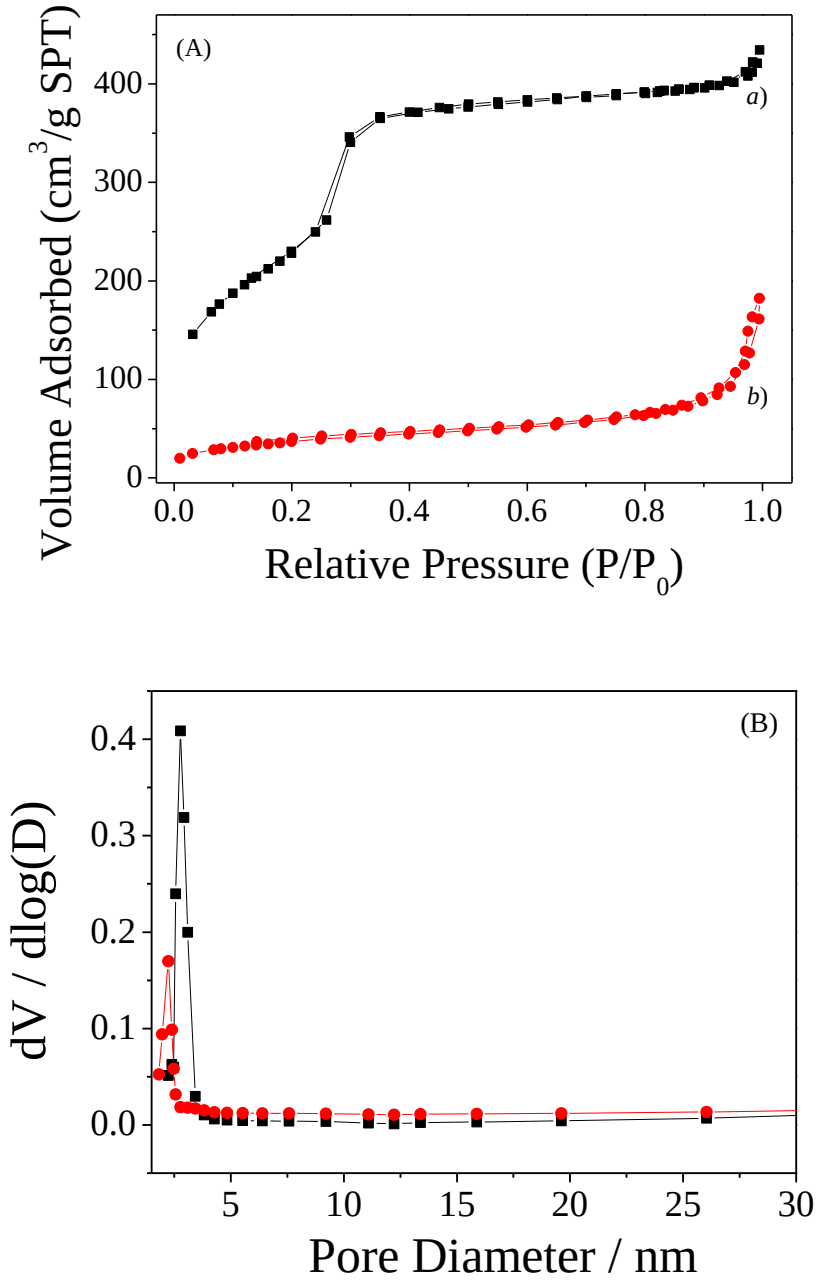


Figure S5. (A) BET nitrogen sorption isotherms and (B) BJH pore size distribution plots of (a) N_3-MSN(NH_2), and (b) P(OEGMA-*co*-RhBHA) coated MSN with CQA in the inner surface.

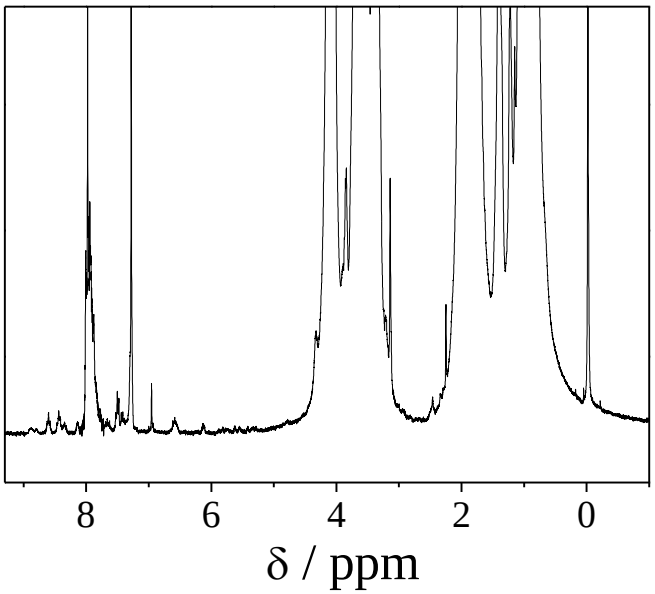


Figure S6. ^{1}H NMR spectrum obtained for the constituents cleaved from P(OEGMA-*co*-RhBHA) coated MSN(CQA) in $CDCl_3$.

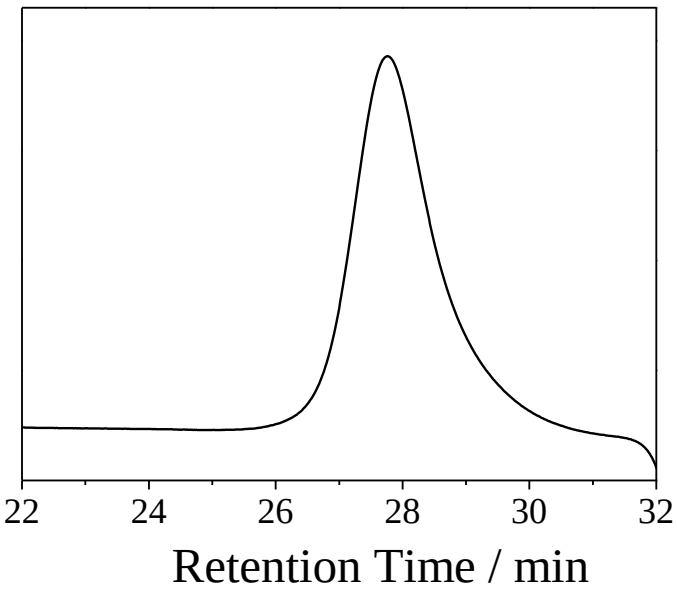


Figure S7. THF GPC curve obtained for the constituents cleaved from P(OEGMA-*co*-RhBHA) coated MSN(CQA).

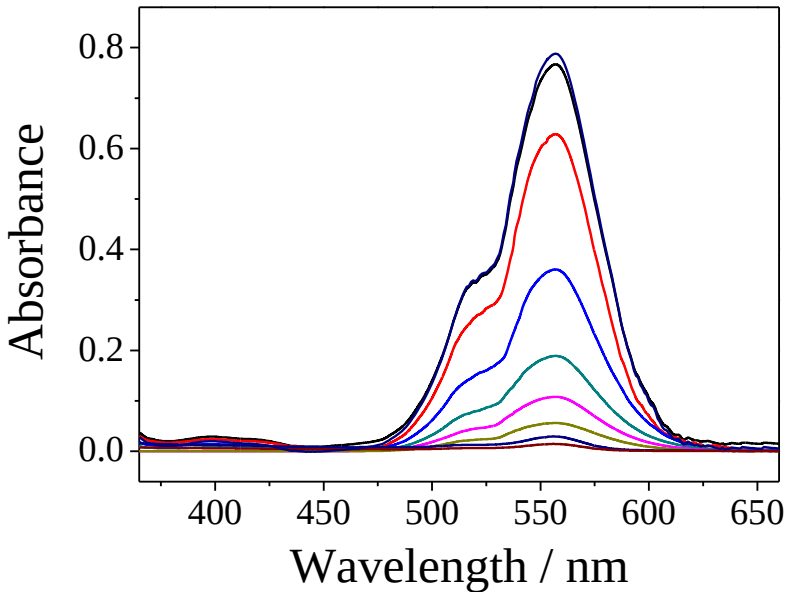


Figure S8. UV-Vis absorbance spectra recorded for RhBHA (2μM, pH 7.0) in 99:1 (v/v) H_2O-CH_3CN solution upon gradual addition of Hg^{2+} (0-10 μM).

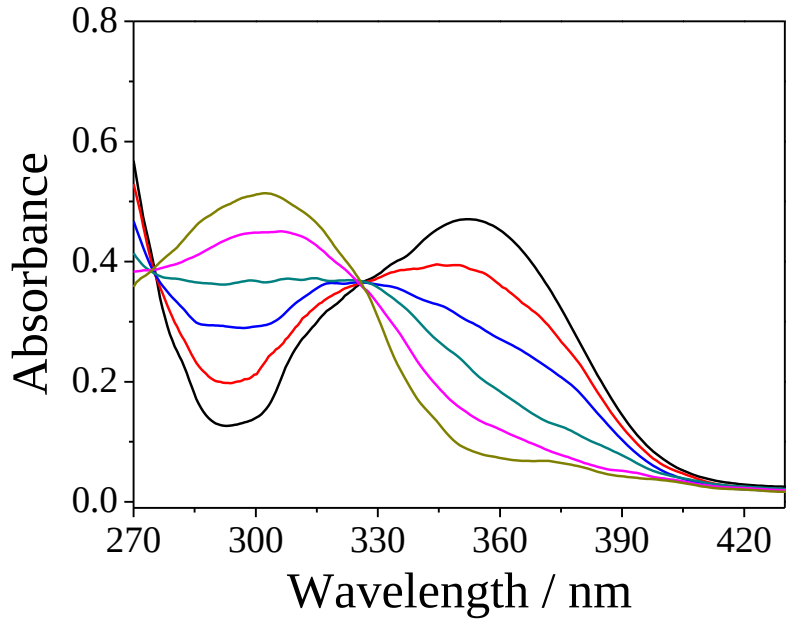


Figure S9. UV-Vis absorbance spectra recorded for CQA derivatives (10 μM, pH 7.0) in 99:1 (v/v) H_2O-CH_3CN solution upon gradual addition of Zn^{2+} (0-10 μM).

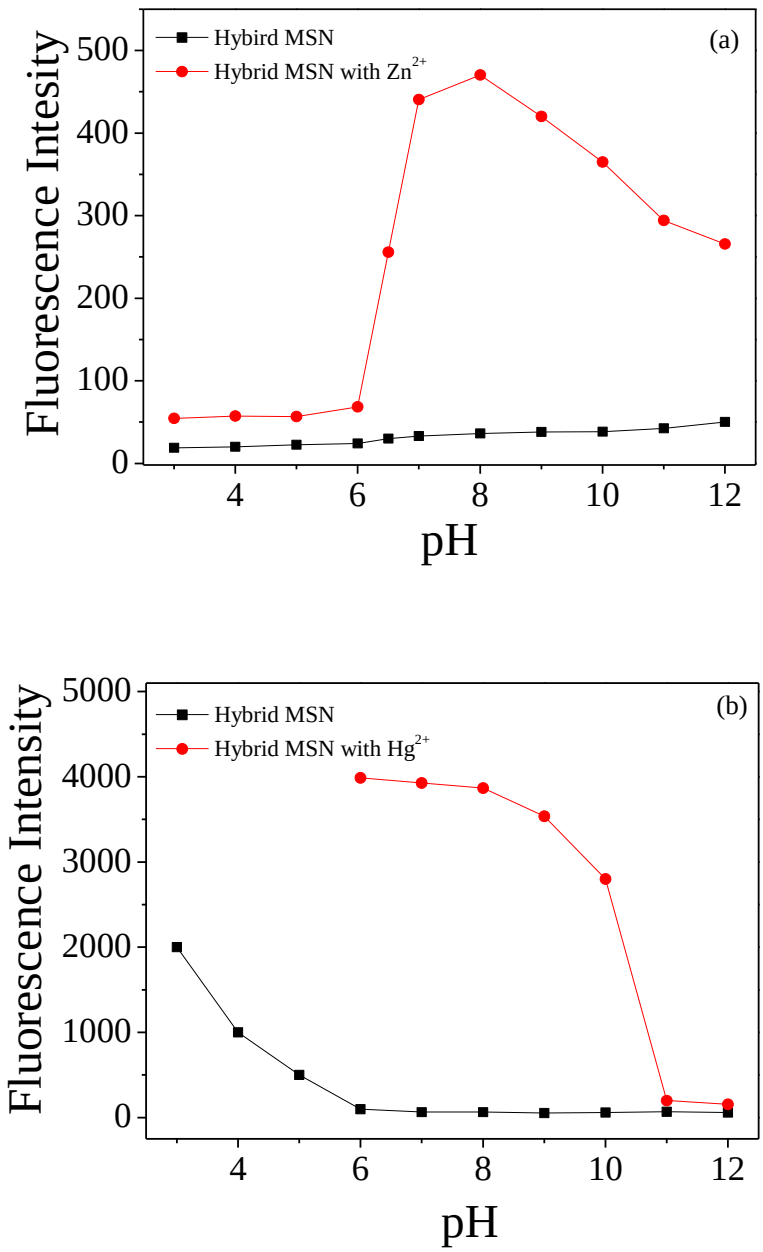


Figure S10. Fluorescence intensity of the hybrid MSN aqueous solution (0.05 g/L) at various pH values in the absence and presence of 5 equiv. (a) Zn^{2+} (λ_{ex} = 370 nm, λ_{ex} = 501 nm), and (b) Hg^{2+} (λ_{ex} = 520 nm, λ_{em} = 580 nm).

Fluorescence Detection of Hg^{2+} and Zn^{2+} in Tap Water. Tap water was collected in the chemical synthesis laboratory of graduate school at Shenzhen, Tsinghua University (Nanshan District, Shenzhen City), and boiling for 10 min before use. Standard addition method was utilized to justify the detection reliability for the current hybrid mesoporous materials following the same procedures according to literature report.[1] After the addition of Hg^{2+} and Zn^{2+} with different known concentration levels, P(OEGMA-*co*-RhBHA) coated MSN(CQA) was introduced to the tap water, and then the mixture was subjected to fluorescence measurement, obtaining a recovery between 94 and 105%.

Reference

1. Y. X. Wang, L. M. Xiong, F. H. Geng, F. Q. Zhang, M. T. Xu, *Analyst*, 2011, **136**, 4809-4814.