

Supporting Information

Ratiometric pH sensor based on mesoporous silica nanoparticles and Förster resonance energy transfer

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1. Synthesis and characterization of the FRET dye pair doped mesoporous silica nanoparticles (FMSNs)

Fluorescein isothiocyanate (FITC) was used as the pH sensitive dye and Rhodamine B isothiocyanate (RBITC) as the reference dye. They were first modified with 3-aminopropyltriethoxysilane (APTS) respectively. Typically, 4.6 mg of FITC or 6.3 mg of RBITC was dissolved in 1136 μL of EtOH and was allowed to react with 50 μL APTS for overnight in the dark. NaOH (0.7 mL, 2 M) was added to 100 mL of cetyltrimethylammonium bromide (CTAB) solution (5.5×10^{-3} M). The mixture was heated to 70 $^{\circ}\text{C}$, followed by the addition of 1.0 mL of tetraethylorthosilicate (TEOS) and 100 μL of APTS-modified dye solution (a mixture of FITC-APTS solution and RBITC-APTS solution in various proportions). After 1 min, 1.0 mL of ethyl acetate was added, and the resulting mixture was stirred at 70 $^{\circ}\text{C}$ for 30 s and then aged for 2 h. After the solution had cooled to roomtemperature, the precipitate was collected by centrifugation and washed with water and ethanol several times. Finally, the pore-generating template, CTAB, was removed by refluxing in acidic ethanol solution.

2. Characterization of the FMSNs

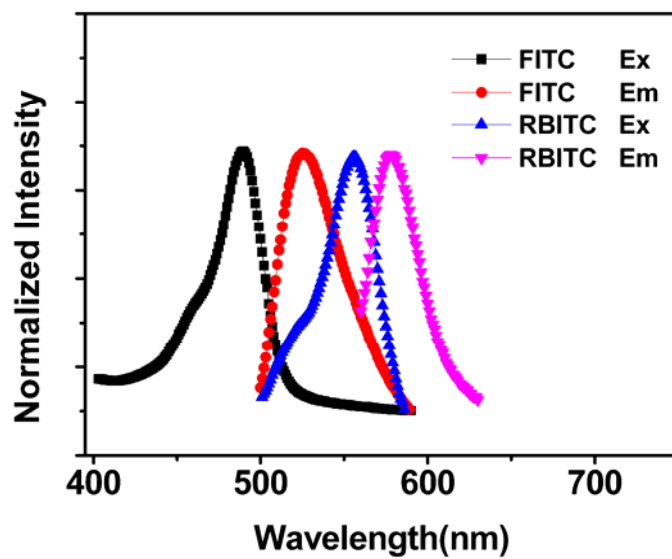


Fig. S1. Excitation and emission Spectra of FITC and RBITC

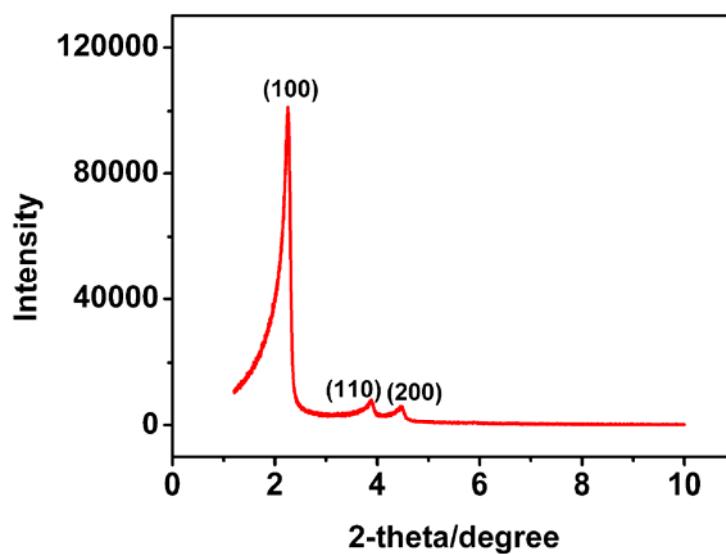


Fig. S2. Low-angle XRD pattern of FMNSs.

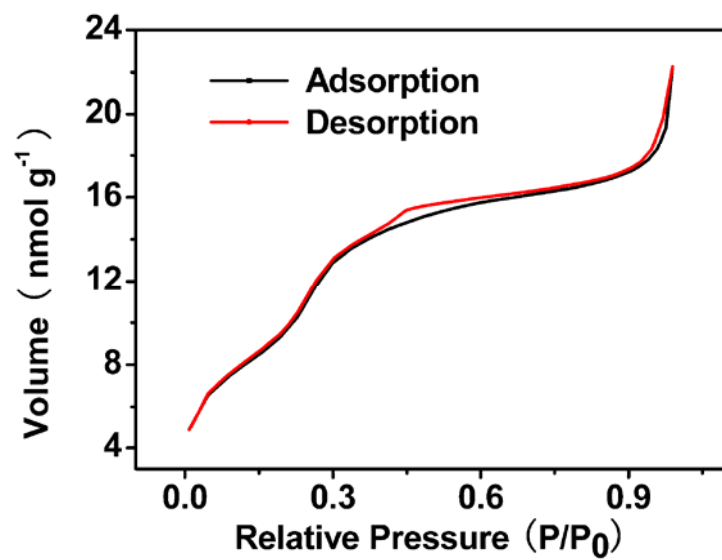


Fig. S3 Nitrogen adsorption-desorption isotherms of FMNSs

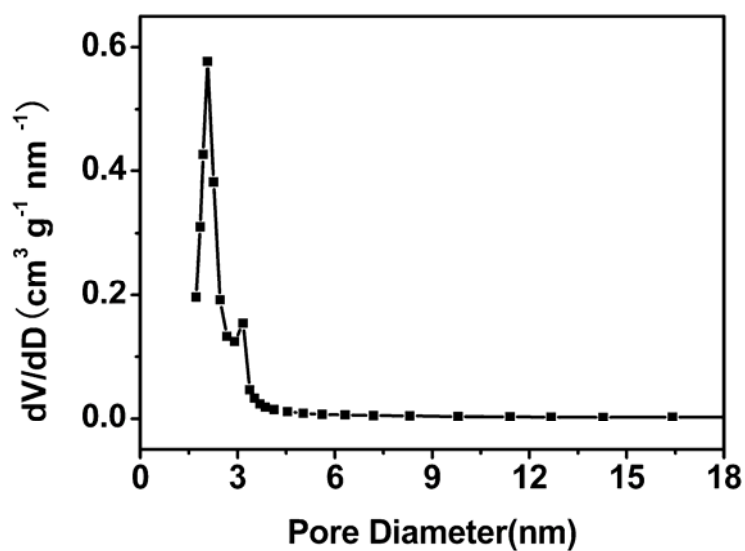


Fig. S4. Pore size distribution of FMSNs.