

Supporting Information

Multi stimuli-responsive photoluminescent nanocomposites of silver nanoclusters with hyperbranched polyethylenimine derivatives

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General procedure for the synthesis of PEI-TMA. Under nitrogen atmosphere, isobutyric anhydride (2.57g, 13.8 mmol) was added dropwise to the mixture of PEI (1.56g, 26.5 mmol of primary and secondary amine groups) and triethyl amine (1.53g, 15.2 mmol) in 20 mL of chloroform at around 5 °C with vigorous stirring. Subsequently, the reaction mixture was kept at room temperature for 24 h. Finally, the reaction temperature was raised to 72°C for 2h to finalize the reaction. The chloroform was removed under vacuum and the residue was dissolved in 40 mL of methanol. One gram of potassium carbonate was added to the solution and the mixture was stirred at room temperature for 5 h. After centrifugation, the solution was concentrated to *ca.* 15 ml and then purified by dialysis against methanol using a benzoylated cellulose membrane (MWCO 1200g/mol) for 3 days. The degree of substitution of TMA group is around 47.5% (relative to the primary and secondary amines of PEI).

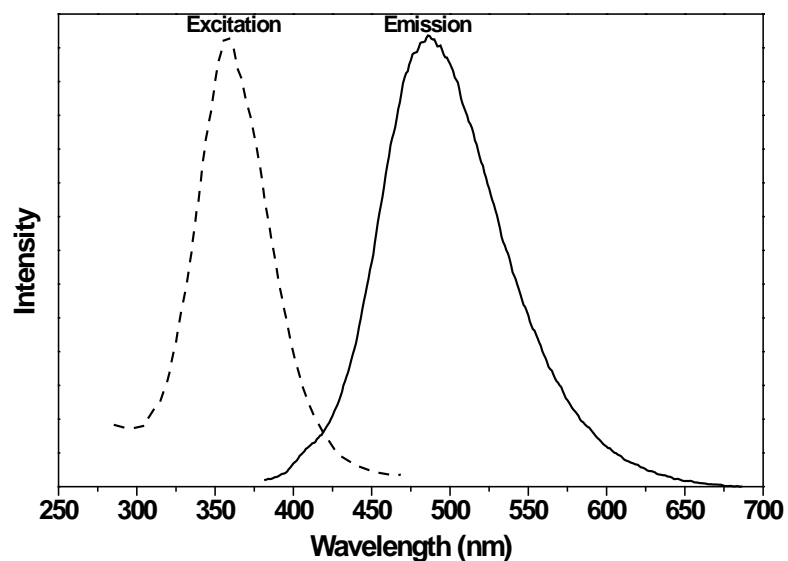


Fig. S1 Typical excitation and emission spectra of AgNCs capped with PEI-TMA in deionized water (concentration of PEI-TMA is 16.7 mM; molar ratio of Ag^+ /PEI-TMA is 1: 5; preparation pH is 5; slit widths of excitation and emission are set to be 10 μm and 10 μm , respectively)

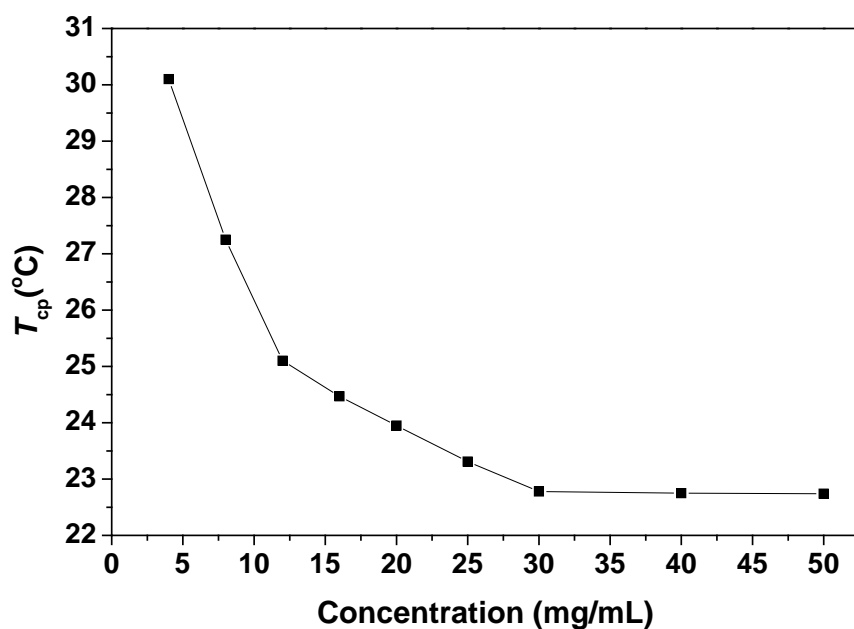


Fig. S2 Influence of the concentration of PEI-TMA in de-ionized water on the cloud-point temperature

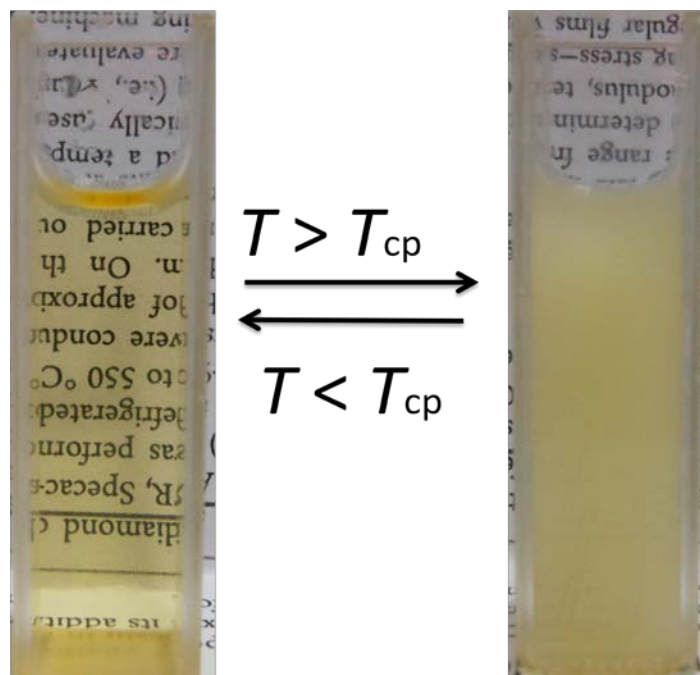


Fig. S3 The typical photographs of the aqueous solution of AgNC-PEI-TMA below and above the phase transition temperature

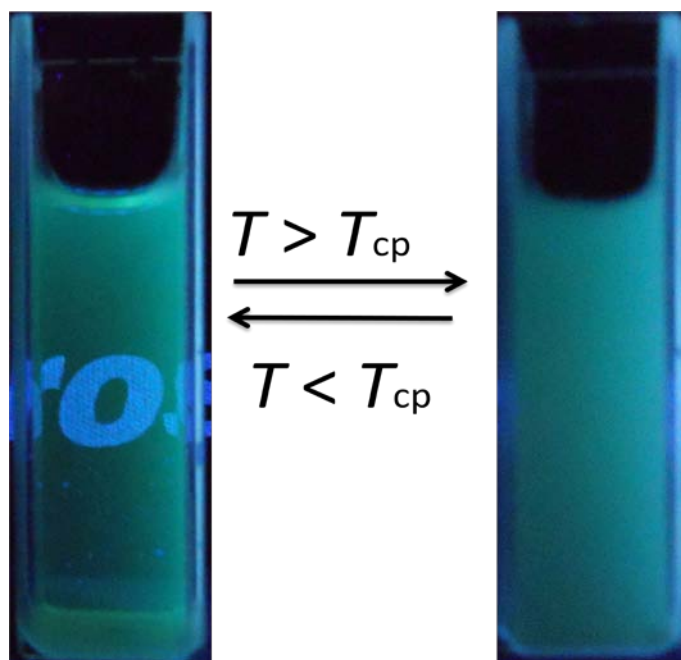


Fig. S4 The typical luminescent photographs of AgNC-PEI-TMA below and above the phase transition temperature

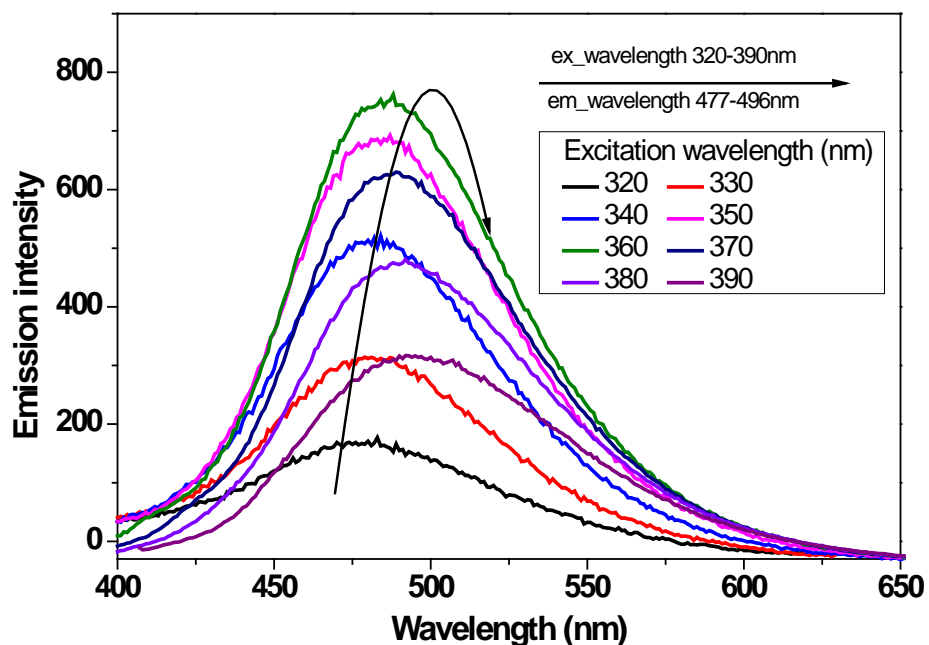


Fig. S5 The typical fluorescence emission spectra of AgNC-PEI-TMA at different excitation wavelengths (concentration of AgNC-PEI-TMA is 0.4 mg mL^{-1}).

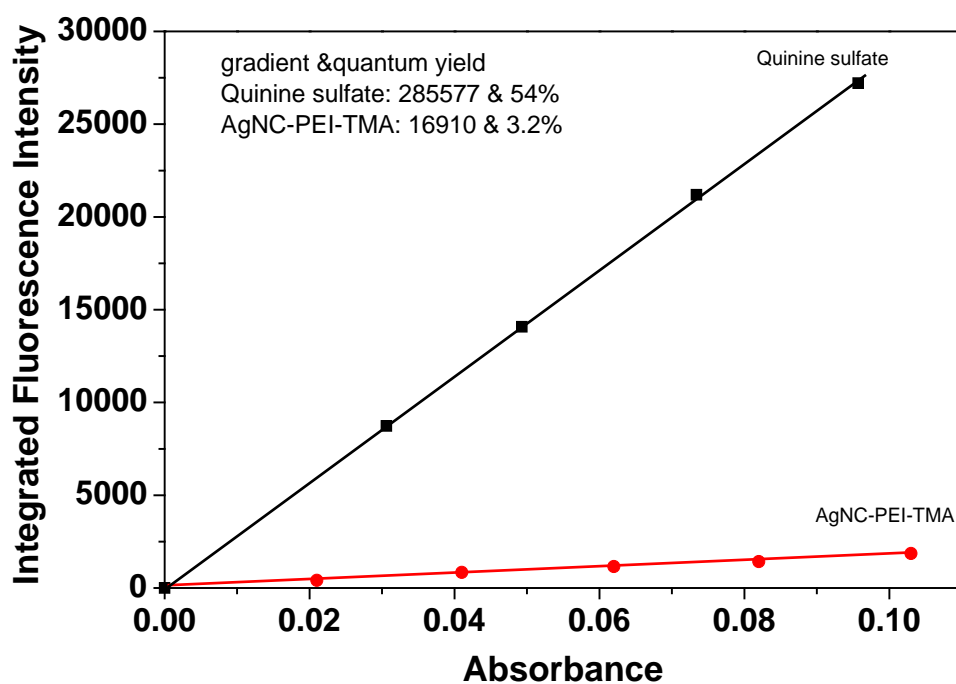


Fig. S6 The curves of integrated fluorescence intensity (excited at 350 nm) versus UV-vis absorbance intensity at 350 nm of quinine sulfate and AgNC-PEI-TMA in water

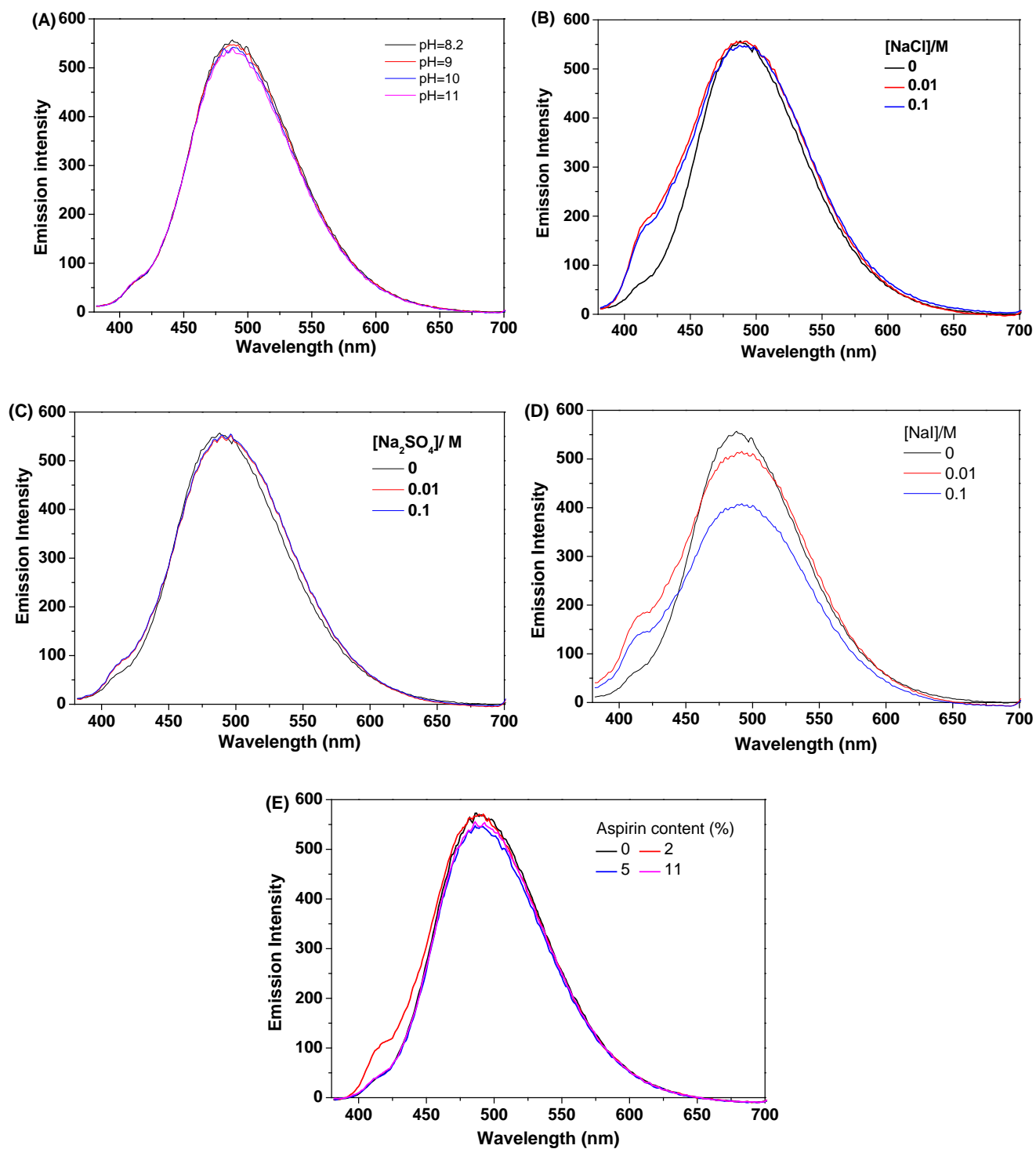


Fig. S7 Typical fluorescence spectra of AgNC-PEI-TMA influenced by (A) pH, (B) NaCl, (C) Na₂SO₄ (D) NaI, and (E) aspirin (concentration of AgNC-PEI-TMA is 0.3 mg mL⁻¹; excitation wavelength is 360 nm).