Supporting Information

for

Bifunctional Quantum Dot-Decorated Ag@SiO_2 Nanostructures for Immunoassays of Surface-Enhanced Raman Scattering (SERS) and Surface-Enhanced Fluorescence (SEF)

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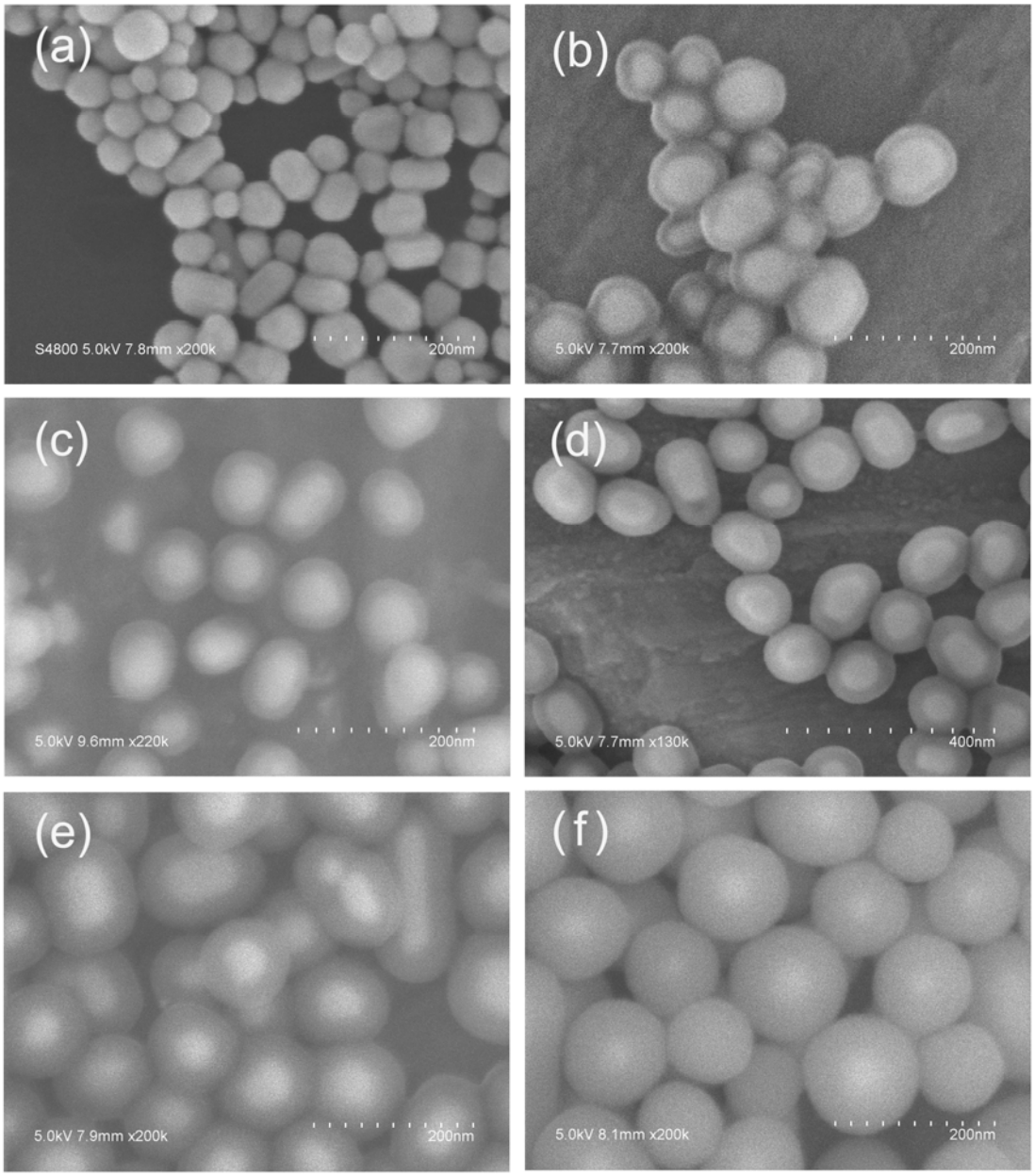

Fig. S1 SEM images of Ag/PATP@SiO_2 nanoparticles with different shell thicknesses (nm): (a) 0; (b) 6; (c) 9; (d) 15; (e) 35; (f) 60. Corresponding to different amounts (mL) of TEOS added (0.1 M): (a) 0; (b) 1.0; (c) 1.1; (d) 1.3; (e) 4.0; (f) 10.

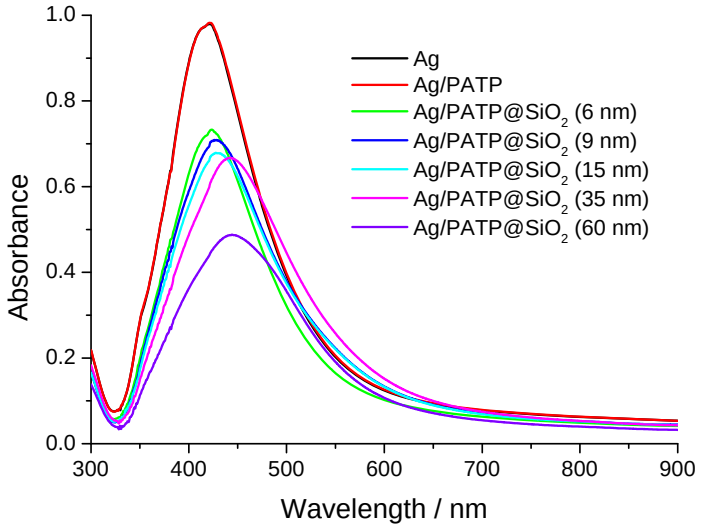

Fig. S2 UV-vis absorption spectra of bare AgNPs, PATP-modified AgNPs (Ag/PATP), and Ag/PATP@SiO_2 with different silica shell thicknesses.

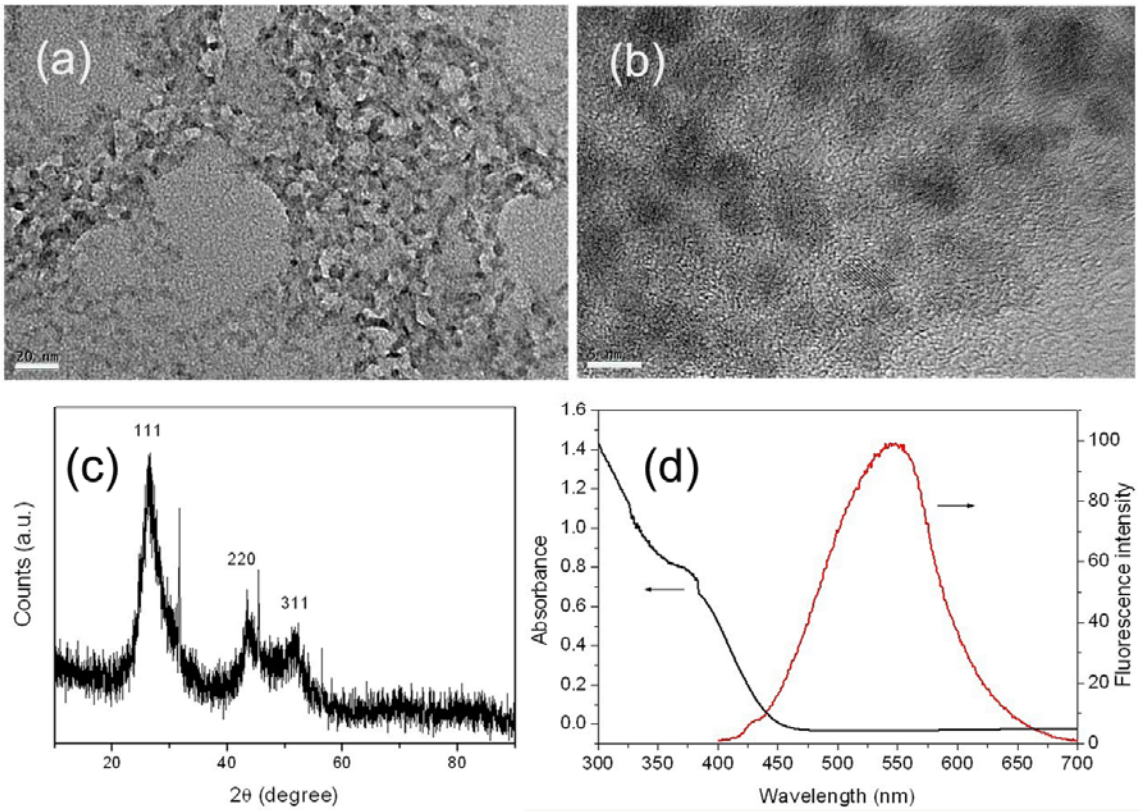

Fig. S3 TEM images (a, scale bar: 20 nm; b, scale bar: 5 nm), XRD patterns (c), UV-vis absorption spectrum, and fluorescence emission spectrum (d, λ_{ex} = 384 nm) of as-synthesized CdS QDs.

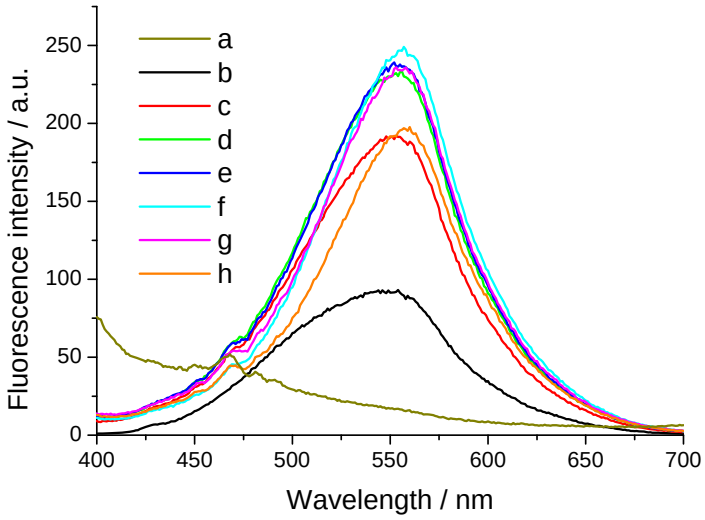

Fig. S4 Fluorescence emission spectra of (a) colloidal solution of amino-functionalized Ag/PATP@SiO_2 with the silica shell of 9 nm thick (1.2 mL), aqueous solutions of TGA-coated CdS QDs (50 μL) upon addition of colloidal solution of amino-functionalized Ag/PATP@SiO_2 (with the silica shell of 9 nm thick) of different volumes (mL): (b) 0, (c) 0.5, (d) 0.8, (e) 1.0, (f)1.2, (g) 1.5, (h) 2.0. The final volumes of the colloidal solutions reached 3.0 mL by adding double-distilled water: λ_{ex} = 384 nm; slit width, 5 nm.

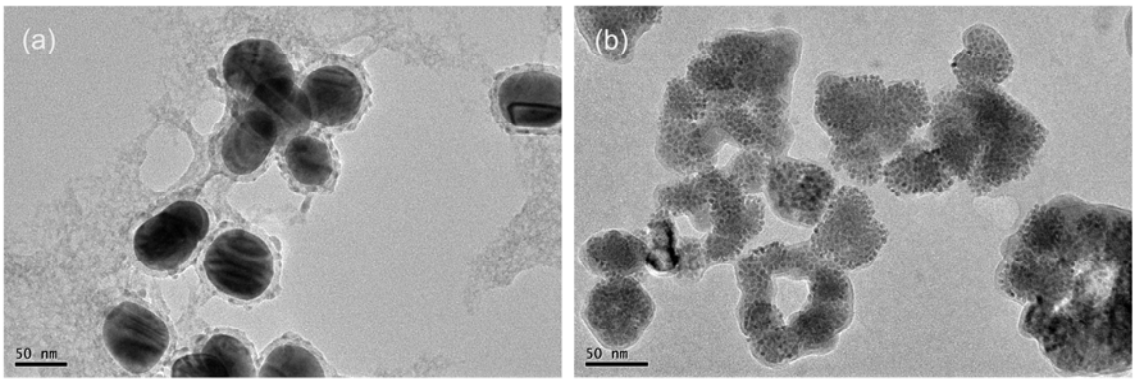

Fig. S5 TEM images of Ag/PATP@SiO_2/QD nanocomposites with the silica shell of 9 nm thick (a) and Ag/PATP@SiO_2/QD nanocomposites after dissolving the Ag cores (b).

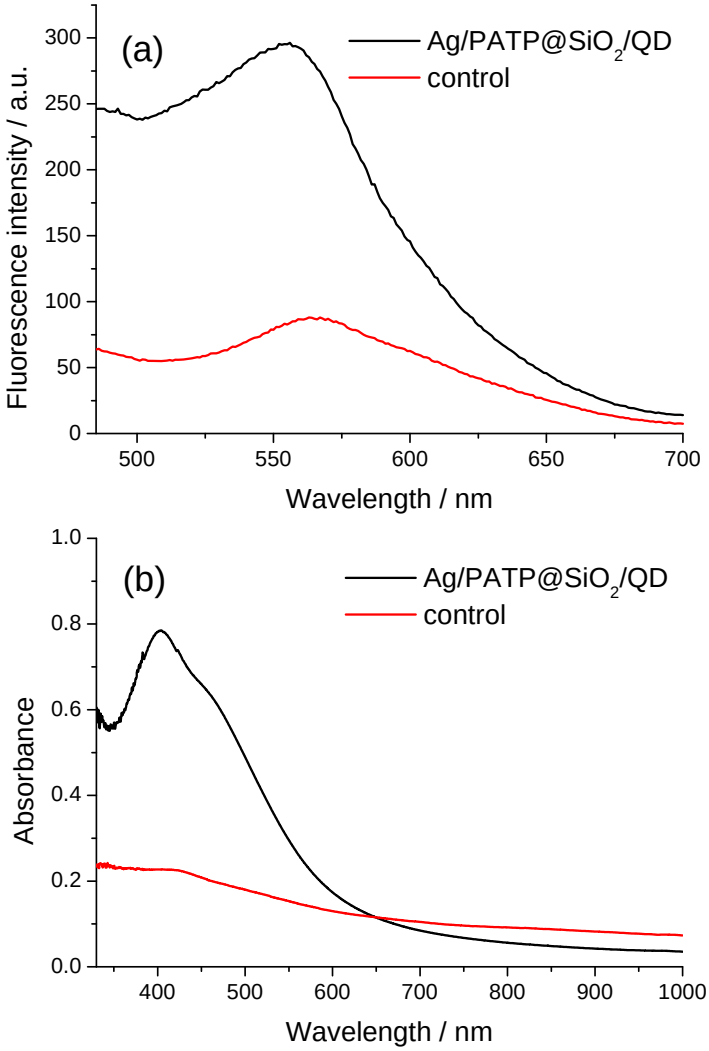

Fig. S6 (a) Fluorescence emission and (b) UV-vis absorption spectra of Ag/PATP@SiO_2/QD with the silica shell of 9 nm thick and after dissolving the Ag cores (control).

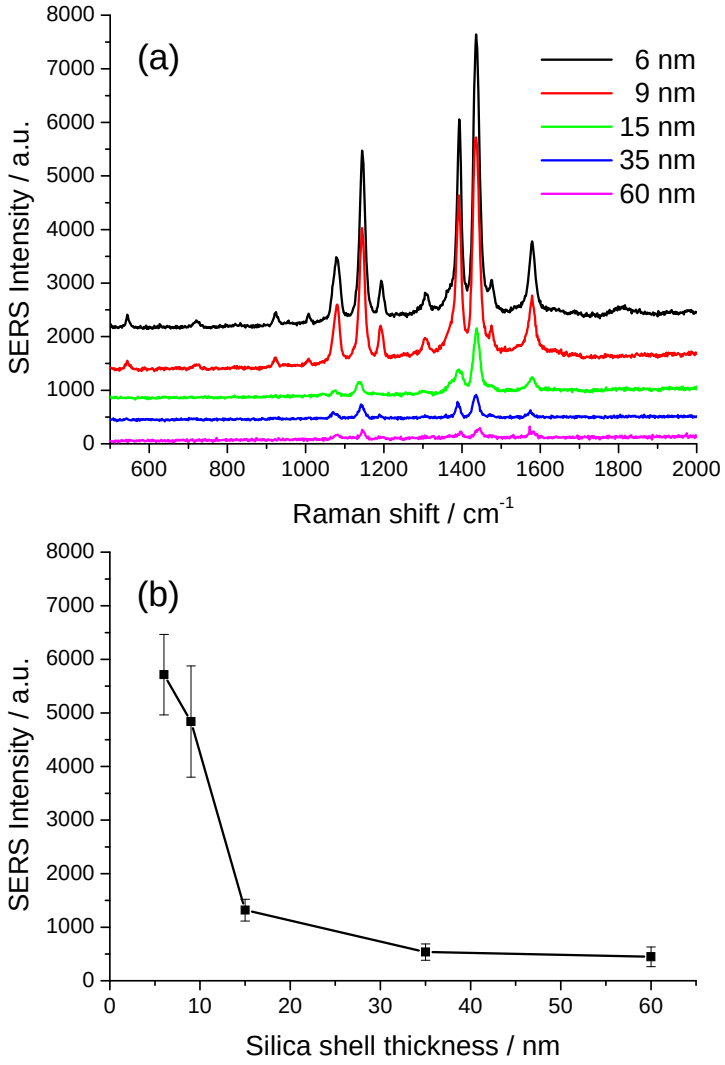

Fig. S7 (a) SERS spectra of Ag/PATP@SiO_2 tags with different thicknesses of silica shells and (b) plot of SERS intensity at 1435 cm^{-1} as a function of shell thickness. Error bars indicate the standard deviations from 3 measurements.