Supporting Information

Stable Aqueous Dispersion of ZnO Quantum Dots with Strong Blue Emission via Simple Solution Route

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Part 1. ZnO QDs synthesized at 60 °C

Figure S1. HRTEM image of the ZnO QDs taken at 60 °C after starting the reaction about 20 min. The average diameter of ZnO QDs is about 3.0 nm. The nanoparticles are steady under the irradiation of intense electron beam, indicating a high crystallization even at 60 °C.
Part 2. The measurement on the quantum yield of ZnO QDs sample

Figure S2. Photoluminescence and absorbance of ZnO QDs sample and Quinine Sulfate

The quantum yield $\phi$ of ZnO QDs sample was calculated by comparing the integrated photoluminescence intensities (excited at 350 nm) and the absorbency values (at 350 nm) of ZnO QDs sample with the references quinine sulfate.

Five concentrations of each compound were made, all of which had absorbance less than 0.1 at 350 nm. Quinine sulfate (literature $\Phi = 0.55$) was dissolved in 0.5 M $\mathrm{H_2SO_4}$ (refractive index ($\eta$) of 1.33). The ZnO QDs sample was dissolved in water ($\eta = 1.33$).

An UV-Vis absorption spectrometer was used to determine the absorbance of the samples at 350 nm. The Quinine sulfate was used as the references. A quartz cuvette with a path length of 1.00 cm was used to contain the samples during the UV-Vis and PL experiments. Excitation slit width of 2.5 nm and an emission slit width of 2.5 nm was used to excite the ZnO QDs sample at 350 nm and to record their photoluminescence spectra.

The quantum yield was calculated using the below equation:

$$\phi_{\text{ZnO-QDs}} = \phi_{\text{ST}} \left(0.55\left(\frac{m_{\text{ZnO-QDs}}}{m_{\text{ST}}}\right)\frac{\eta_{\text{ZnO-QDs}}^2}{\eta_{\text{ST}}^2}\right) = 0.55 \times 1.38 = 0.76$$

Where $\phi$ is the quantum yield, $m$ is slope, $m$ is the gradient from the plot of integrated fluorescence intensity vs absorbance, $\eta$ is the refractive index of the solvent, ST is the standard of Quinine Sulfate.
Part 3. Sample S4 synthesized with higher Zn$^{2+}$ concentration

Figure S3. HRTEM image of ZnO QDs in S4, which was synthesized using the same recipe and process as S1 except for using 4.0 mM aqueous zinc nitrate.