

Size- and shape-controlled synthesis of ZnSe nanocrystals using SeO₂ as selenium precursor

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Large scale synthesis of ZnSe nanocrystals using inverse injection method

Solution for Se precursor: It was made by degassing a mixture of SeO₂ (2.218 g, 20 mmol) and 200 mL of ODE in a 500 mL three-neck flask, then it was heated to 240 °C for 10 min in air.

Solution for Zn precursor: A mixture (60 mL in total) of ZnO (2.44 g, 30mmol), oleic acid (120 mmol, 34.5 ml), and 25.5 mL paraffin oil was loaded in a 100 mL three-neck flask and heated to 300 °C under nitrogen to obtain a colorless clear solution.

Synthesis of ZnSe nanocrystals: 200 mL Se precursor and 200 mL paraffin oil were mixed and heated to 300 °C under nitrogen gas flow in a 1000 mL flask. Next, 40 mL

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Zn Precursor solution was injected and the temperature was lowered to 280 °C for nanocrystal growth. The nanocrystals were precipitated twice through adding the solution into acetone, separated through spinning at 6000 rpm for 20 min, and then dried in vacuum overnight. ZnSe nanocrystals (more than 2 g) were obtained finally (Fig. S1).

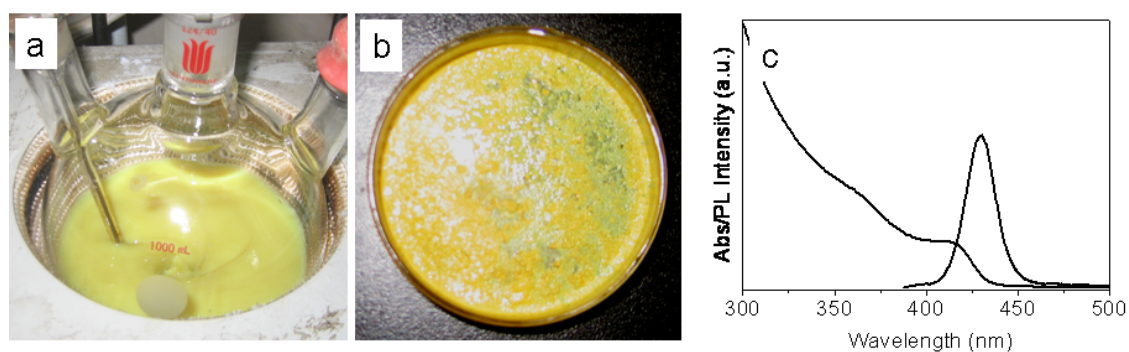


Fig. S1 Photos of large scale synthesis of ZnSe nanocrystals in a 1000 mL three-neck flask (a), purified powder sample (b), and corresponding absorption and PL spectra of large scale synthesized ZnSe nanocrystals (c).

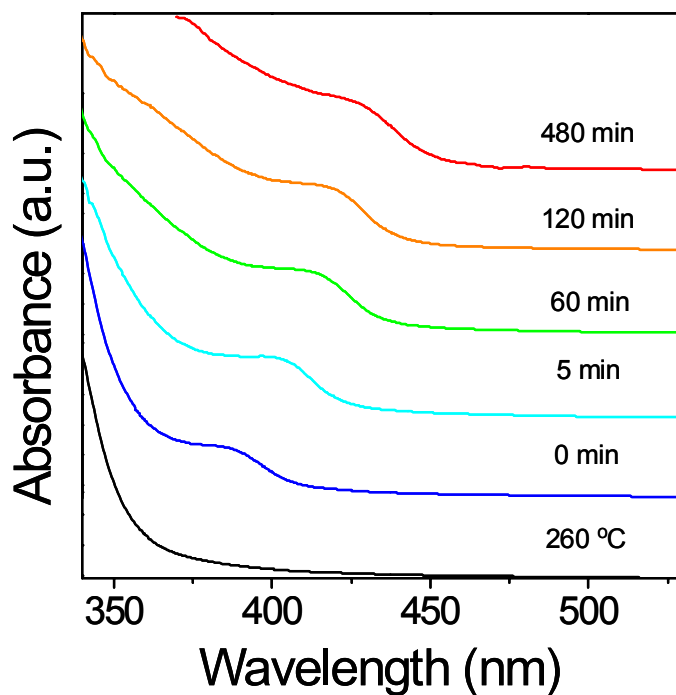


Fig. S2 Temporal evolution of the absorption spectra of ZnSe nanocrystals synthesized by non-injection method. The time was counted as zero when the temperature reached 280 °C.