Electronic Supplementary Information for

Facile Preparation of Rare-earth Semiconductor Nanocrystals and Tuning their Dimensionalities

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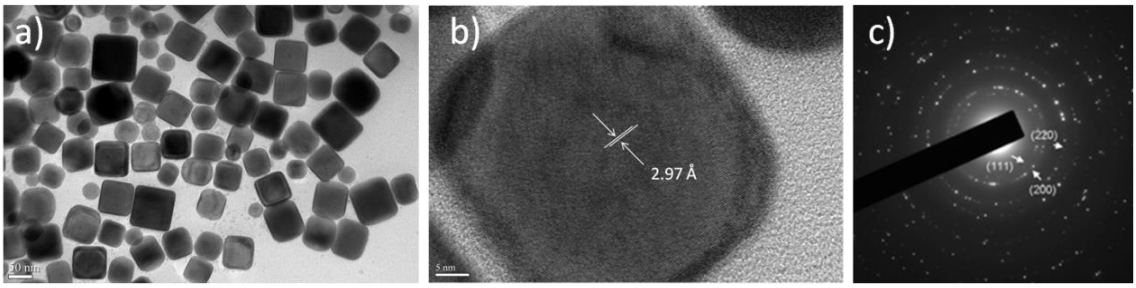

Figure S1. a) TEM image of EuS-up-scale NCs; b) HRTEM image of EuS-up-scale NCs; c) SAED patterns.

Synthesis of CdS nanocrystals.

257 mg CdO was dispersed in 2.03 g oleic acid, which was heated up to 180^{o}C under N_2 atmosphere and reacted for 2 hours to form $Cd(oleate)_2$. 10.0 g oleylamine was added and the solution was heated up to 280-310^{o}C. Consequently, 0.5 mL CS_2 was dropwise added within 5 minutes with controlled speed to avoid the explosive boiling. After reacting for 30 minutes, the reaction was cooled down to room temperature. The reaction mixture was dispersed to toluene, and the product was

collected via centrifugation and washed for 4 times with the mixture solvent of toluene and ethanol (v/v = 1/1). Finally, the product was dried under air to give rise to 242 mg yellowish solids.

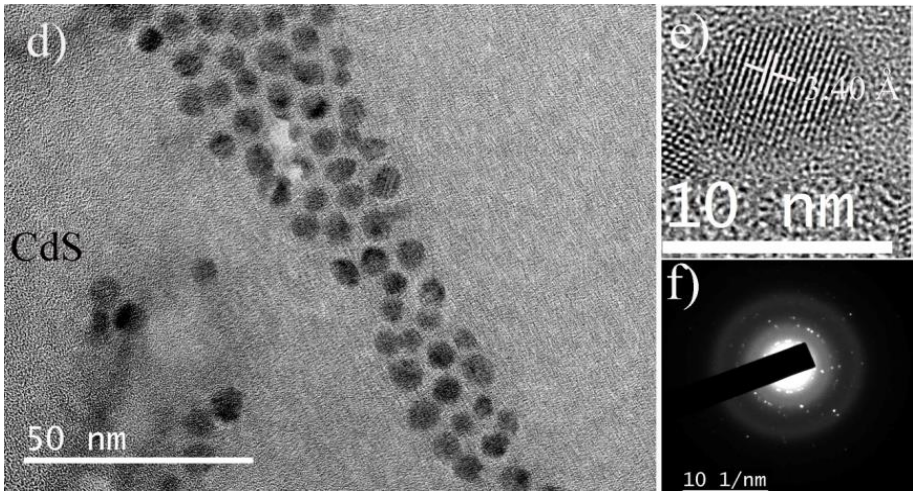

Figure S2. TEM and SAED pattern of CdS nanodots .

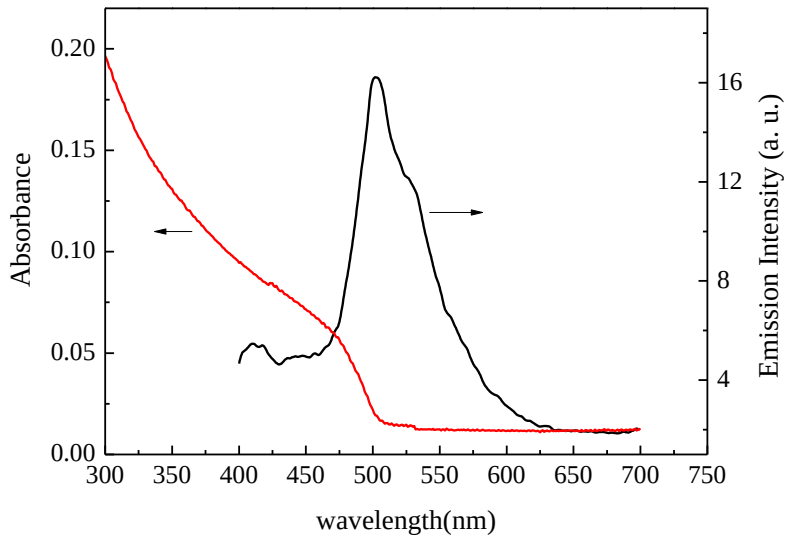

Figure S3. UV-vis and photoemission spectra of CdS NDs. The excitation wavelength was 370 nm.

Synthesis of PbS nanocrystals.

$Pb(OAc)_2$ $3H_2O$ (386 mg) was dissolved in oleylamine (1 mL) under N_2. The solution was heated up to 120^{o}C and kept 30 minutes at this temperature. Then the

temperature was decreased to 75 ^{o}C and CS_2 (0.1 mL) was dropwise added within 2 minutes. After reacting for 10 minutes, the reaction mixture was cooled down to room temperature and dispersed to *n*-hexane solution. The mixture was centrifuged to remove excess $Pb(OAc)_2$. The nanocrystals were precipitated from the supernatant by adding minimum amount of ethanol, and collected via centrifugation and washed for 4 times with the mixture solvent of toluene and ethanol (v/v = 1/1). Finally, the product was dried under air to give rise to 211 mg black solids.

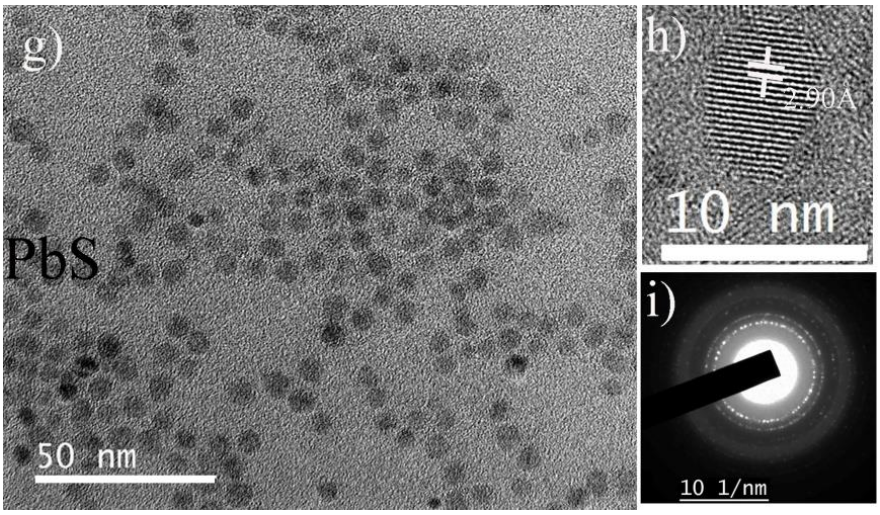

Figure S4. TEM and SAED pattern of PbS nanodots .

Synthesis of ZnS nanocrystals.

$Zn(OAc)_2 \cdot 2H_2O$ (438 mg) was dissolved in oleylamine (5 mL) under N_2. The solution was heated up to180^{o}C, and CS_2 (0.6 mL) was dropwise added within 5 minutes. After reacting for 1.5 hours, the reaction was cooled down to room temperature. The reaction mixture was dispersed to toluene, and the product was collected via centrifugation and washed for 4 times with the mixture solvent of toluene and ethanol (v/v = 1/1). Finally, the product was dried under air to give rise to

181 mg yellowish solids.

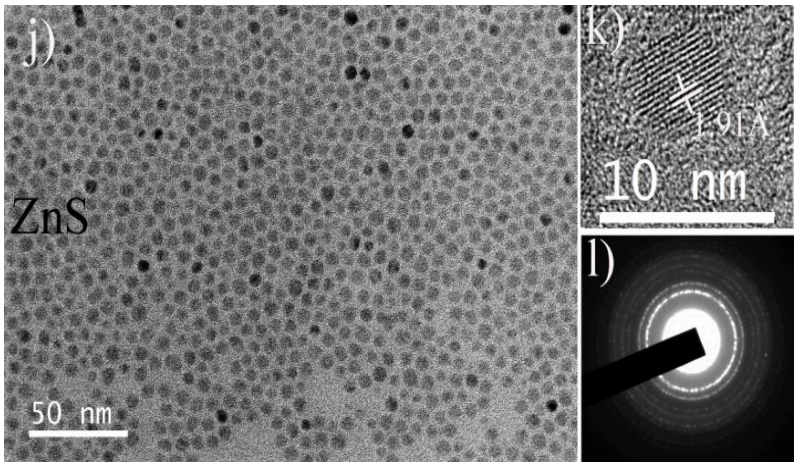

Figure S5. TEM and SAED pattern of ZnS nanodots .

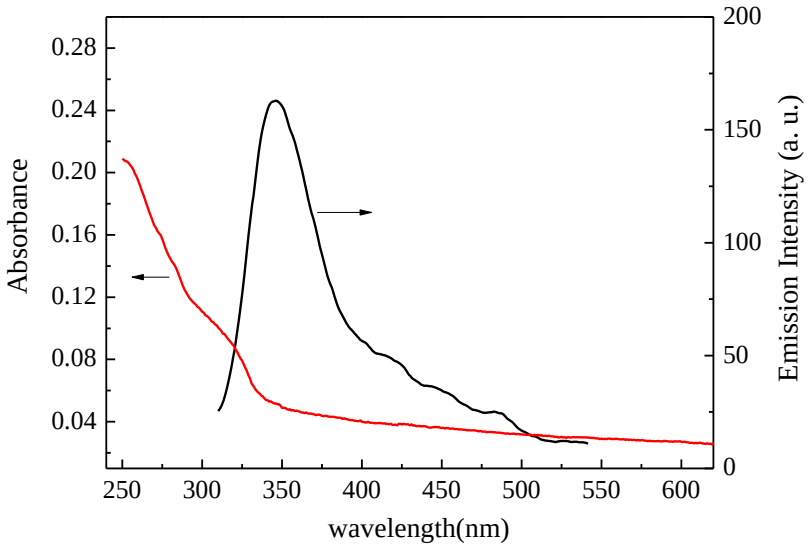

Figure S6. UV-vis and photoemission spectra of ZnS NDs. The excitation wavelength was 290 nm.

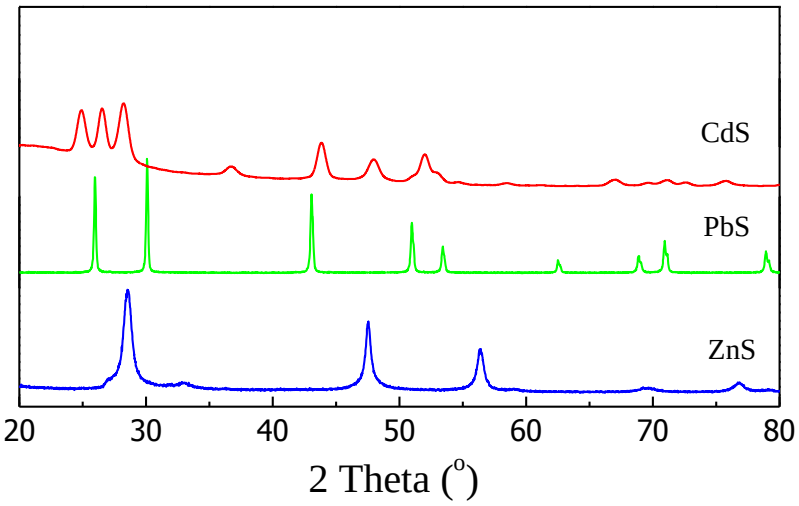

Figure S7. XRD patterns of CdS, PbS and ZnS NDs