

Supporting information for J. Phys. Chem. C

Luminescent Cadmium Sulfide Nanochains Templated on Unfixed Deoxyribonucleic Acid and Their Fractal Alignment by Droplet Dewetting

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Influence of Molar Ratio of DNA to Cd^{2+} on Morphology of CdS NCs

To optimize the molar ratio of DNA to Cd^{2+} , different volumes of 2.0 mM cadmium chloride solution were used to synthesize a series of CdS NCs. The morphology and size of the as-synthesized CdS NCs were characterized by TEM (Figure S1). Obviously the CdS NCs prepared at the molar ratio of 1:1 showed the best morphology of linear CdS NCs, at which the optimal volume of 2.0 mM cadmium chloride solution was 4.6 mL when 9.2 μmol DNA (per nucleotide phosphate) was used for preparation of the CdS NCs.

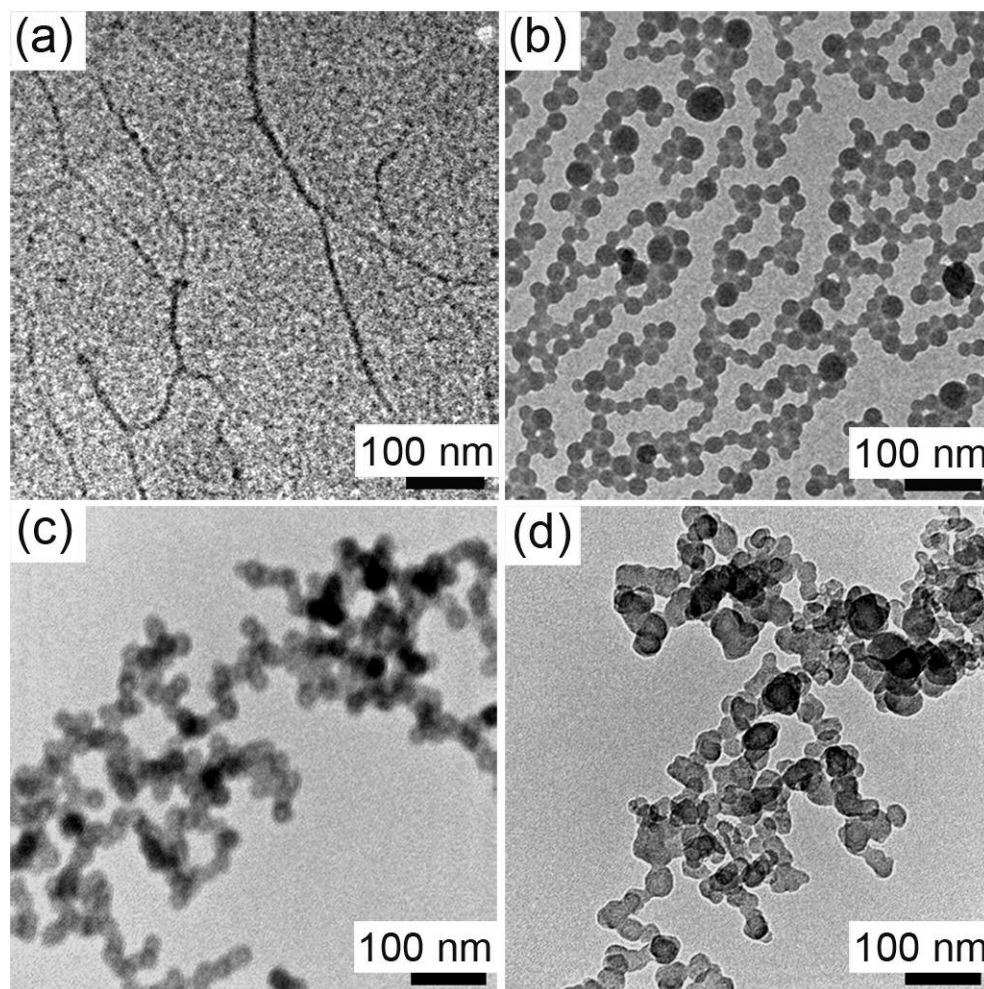


Figure S1. TEM images of CdS NCs at 2:1 (a), 1:1 (b), 1:1.3 (c), and 1:2 (d) molar ratios of DNA to Cd^{2+} .

Energy-dispersive X-ray Spectrum of CdS NCs

The composition of CdS NCs prepared at 1:1 molar ratio of DNA to Cd^{2+} were validated by energy dispersive X-ray spectrum (EDS) and shown in Figure S2. Besides the Cu element from copper grid, the peaks for N, O, P, S and Cd elements could be detected. The appearance of P element should be attributed to DNA, while N element should be attributed to DNA and AET.

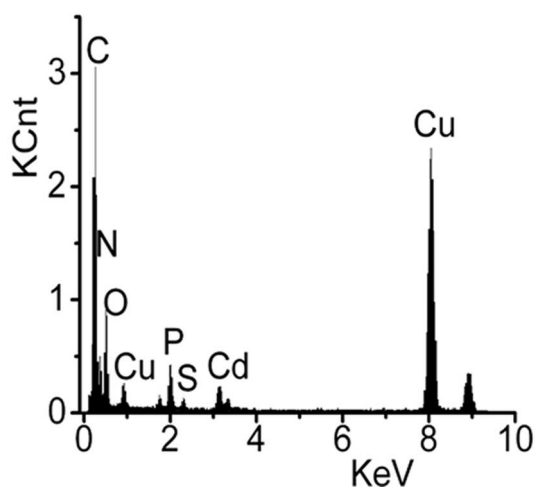


Figure S2. Energy-dispersive X-ray spectrum of CdS NCs in domain of TEM image obtained at the optimal molar ratio of DNA to Cd^{2+} .

Influence of Molar Ratio of DNA to Cd^{2+} on PL Excitation Spectra of CdS NCs

The PL excitation curves of CdS NCs revealed broad bands ranging from 310 to 370 nm (Figure S3).

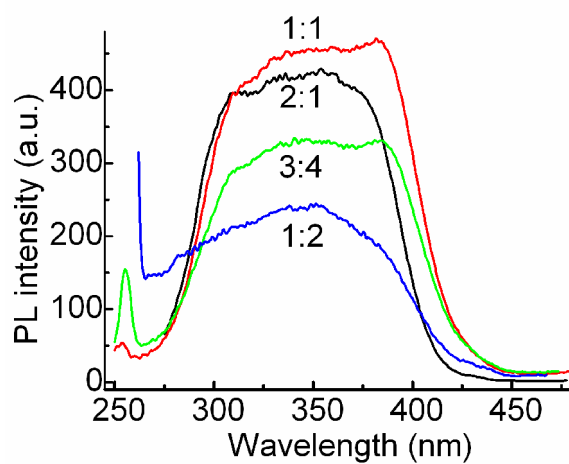


Figure S3. PL excitation of CdS NCs at different molar ratios of DNA to Cd^{2+} .

Cyclic Scan ECL Curve of CdS NCs in Aqueous Solution

In aqueous medium a couple of oxidation and reduction peaks appeared at -0.66 and -1.20 V, respectively (Figure S4). The anodic peak at -0.66 V for hole injection was related to CdS/S⁰ couple, which was also observed for thioglycerol-capped CdS nanocrystals.^{S1} The cathodic peak for onset of electron injection at -1.20 V was comparable to the CdS/Cd⁰ couple.^{S2} Upon the cathodic scan the reduction current further increased, correspondingly, the ECL intensity increased.

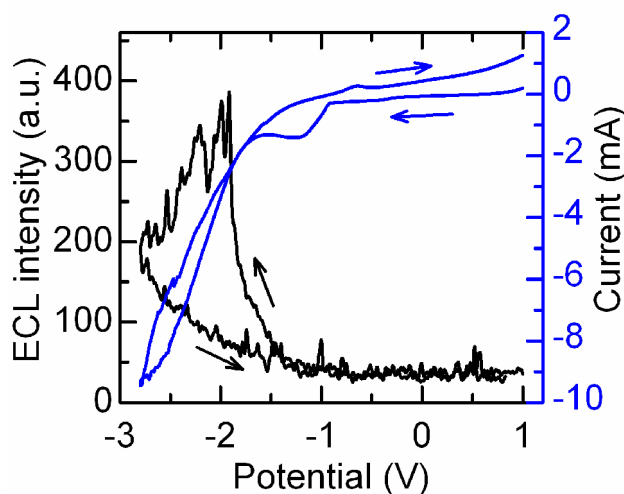


Figure S4. Cyclic scan ECL curves of CdS NCs modified electrode at 400 mV s⁻¹ in 0.1 M pH 7.4 phosphate buffer saline containing 0.1 M KNO₃.

References

- (S1) Haram, K.; Quinn, B. M.; Bard, A. J. *J. Am. Chem. Soc.* **2001**, *123*, 8860.
- (S2) Cao, X. Z.; Zhang, W. H. *Inorganic Chemistry* (2nd Edition), High Education Publishing Company, Beijing, 1983, pp. 625.