# SUPPORTING MATERAILS

# Strong Anodic Near-infrared Electrochemiluminescence from CdTe Quantum Dots at Low Oxidation Potentials

**Gui-zheng Zou*, Guo-dong Liang and Xiao-li Zhang**

*School of Chemistry and Chemical Engineering, Shandong University, Jinan 250100, China*

Email: *zouguizheng@sdu.edu.cn*

**Chemicals and Materials.** All chemicals used in the experiments were of analytical grade or the highest purity grade (commercially available) and were used without further purification. Mercaptopropionic acid (MPA) was obtained from Aldrich Chemicals. $Na_2TeO_3$ were obtained from Shanghai Jingchun reagent Co., Ltd, (Shanghai, China). Rhodamine 6G was obtained from Acros Organics (NJ, USA). Sodium hexametaphosphate was obtained from GuangCheng Chemical Co., Ltd (Tianjin,China). Hydrazine hydrate was obtained from Sinopharm Chemical Reagent Co.,Ltd (Shanghai,China). All solutions were prepared with double distilled water.

**Synthesis of CdTe QDs.** 1.6 mL cadmium chloride solution ($CdCl_2$, 0.10 mol/L) $CdCl_2$ was added to a three-necked flask containing 50 mL $H_2O$, and then HMP (293.6 mg), MPA (34.6μL) were added successively under magnetic stirring. After solution pH was adjusted to 8.0 by adding dropwise 1.0 $mol \cdot L^{-1}$ NaOH，$Na_2TeO_3$ (5.3mg) was added to the above solution and the crude turned to green yellow immediately. After the resulting mixture was refluxed at 100 ˚C for 10 min, 2.4 mL of $N_2H_4 \cdot H_2O$ was injected to the above solution, and then the final mixed solution was refluxed under open-air condition for 10, 15 and 20 h to obtain NIR water-soluble CdTe QDs. The final molar ratio of HMP/$Cd^{2+}$/Te/MPA/$N_2H_4 \cdot H_2O$ was 3:1:0.15:2.5:2000. The obtained crude products were precipitated for three times by ethanol with centrifugation at 12000 rpm for 60 min and the resultant precipitates were re-dissolved in double distilled water as stock solution for other

characterizations.

The concentration of as-prepared CdTe QDs stock solutions was estimated to be 1.97 μmol/L with refluxing time of 10 h.[1] The PL quantum yields of was estimated to be 20% by using Rhodamine 6G in ethanol (QY = 95%) as PL reference[2]. The normal ECL measurement was carried out with CdTe QDs refluxed for 10 h, excepted with specific statements.

**Apparatus and Characterization.** Absorption spectra were obtained using a TU 1901 UV-vis spectrophotometer (Beijing, China). Photoluminescence and electrochemiluminescence (ECL) spectra were recorded with a WGY-10 spectrofluorimeter (Tianjin, China). Cyclicvoltammetric (CV) and ECL behaviors were studied on an MPI-A multifunctional electrochemical and chemiluminescent system (Xi'an Remex Analytical Instrument Ltd. Co., China) at room temperature with a configuration consisting of a glass carbon working electrode (5.0 mm in diameter), a Ag/AgCl (saturated KCl) reference electrode, and a platinum counter electrode. All potentials were quoted in this manuscript against this reference electrode. Anodic potential was applied to the glass carbon electrode to produce ECL. The ECL spectrum was collected with WGY-10 spectrofluorimeter (Tianjin, China) by holding potential at 0.88 V. Differential pulse voltammetry was performed on CHI 832 analyzer.

Reference

(1) Yu, W.W.; Qu, L.; Guo, W.; Peng, X. *Chem. Mater*. **2003**, *15*, 2854-2860.

(2) Crosby, G. A.; Demas, J. N. *J. Phys. Chem*. **1971**, *75*, 991.