

## ELECTRONIC SUPPORTING INFORMATION

# Controllable Synthesis of Quantum-Dot-Polymer Networks with Enhanced Luminescence via Catalytic Chain Transfer Polymerization (CCTP) Technique

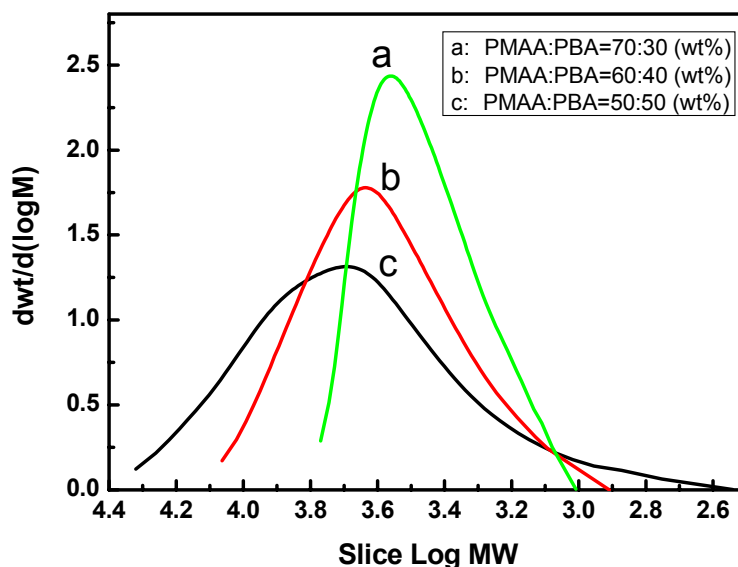
ShengYang Yang, Qing Li, Li Chen and Su Chen\*

State Key Laboratory of Material-Oriented Chemical Engineering and College of Chemistry and Chemical Engineering, Nanjing University of Technology, No. 5 Xin Mofan Rd., Nanjing, JiangSu 210009 (P.R. China)

### Measurement details of polymeric ligands

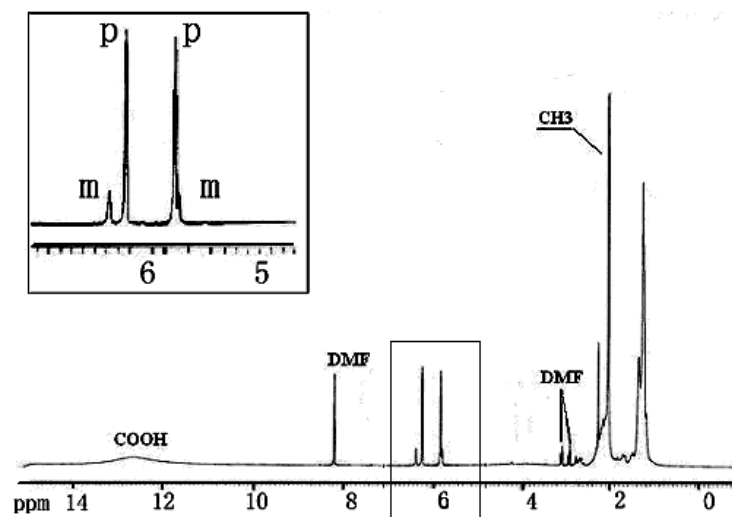
**Table S1.** GPC data of PMAA oligomers and its block copolymers PMAA-*b*-PBA

Samples	$M_n$	$M_w$	PDI
PMAA	2336	2486	1.064212
PMAA- <i>b</i> -PBA (PMAA : PBA = 70 : 30 wt/wt)	2746	3162	1.151493
PMAA- <i>b</i> -PBA (PMAA : PBA = 60 : 40 wt/wt)	3387	4466	1.318571
PMAA- <i>b</i> -PBA (PMAA : PBA = 50 : 50 wt/wt)	3363	6010	1.787094

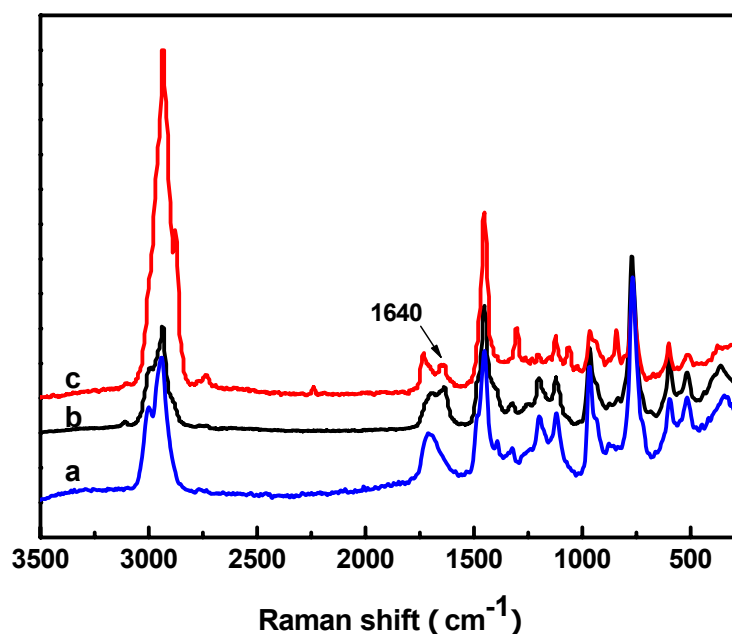


**Fig. S1** Molecular weight distribution of PMAA-*b*-PBA via RAFT (solvent: isopropanol; reaction time:

5 h) a: PMA : PBA = 70 : 30 wt/wt; b: PMAA : PBA = 60 : 40 wt/wt; c: PMAA : PBA = 50 : 50 wt/wt.

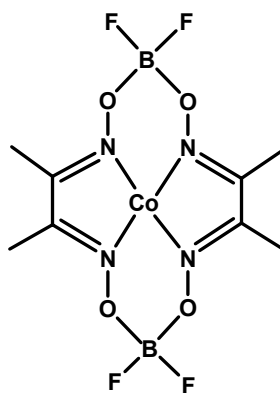


**Fig. S2**  $^1\text{H}$  NMR (300 MHz, DMF) of poly (methacrylic acid) macromonomer prepared via CCTP with the water resonance reduced by solvent suppression. p: vinyl protons in the product; m: vinyl protons in the monomer. (solvent: DI water; reaction time: 1 h).



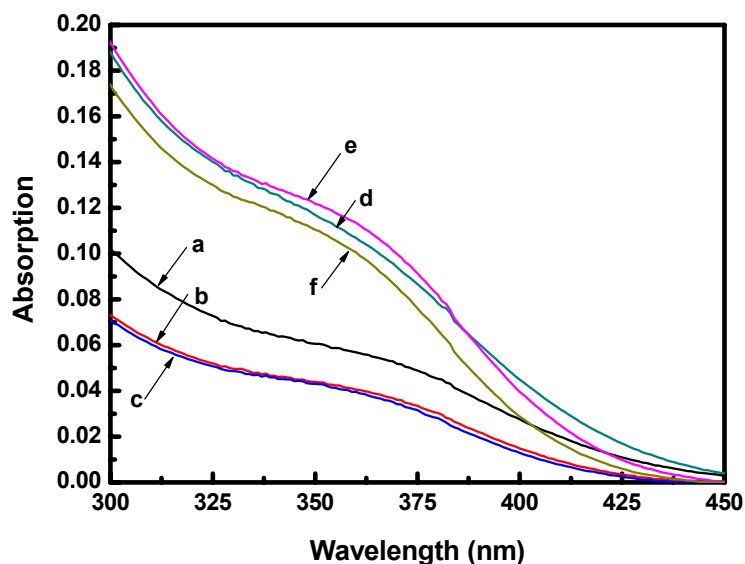
**Fig. S3** Raman shift spectra of (a) PMAA prepared via free radical polymerization (solvent:  $\text{H}_2\text{O}$ , reaction time: 5h) (b) via CCTP (solvent:  $\text{H}_2\text{O}$ , reaction time: 1h); (c) PMAA-*b*-PBA block copolymer prepared via RAFT (solvent: 2-propanol, reaction time: 5 h).

**The Raman shift**  $1640\text{ cm}^{-1}$  indicates the unsaturated carbon-carbon double bonds in end-groups of long chain polymer, which demonstrates CCTP and RAFT processes are very effective to control the structure of polymers.

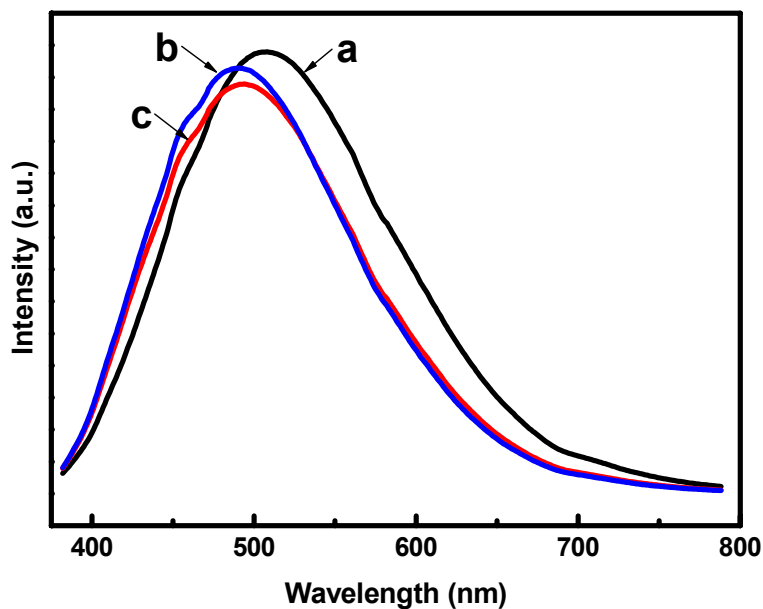


**Scheme S1.** Structure of cobalt catalyst CoBF

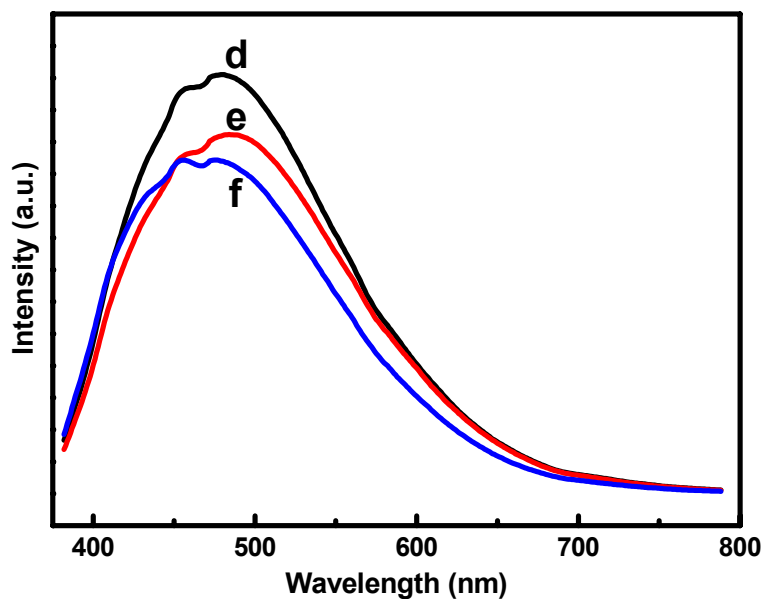
UV-vis and fluorescence measurements of a series of CdS NCs by varying molar ratios of the polymeric ligand to cadmium acetate ( $-\text{COOH}/\text{Cd}^{2+}$ )



**Fig. S4** UV-vis absorption spectra of CdS nanoparticles stabilized by PMAA (a:  $-\text{COOH}/\text{Cd}^{2+} = 4/1$  mol/mol; b:  $-\text{COOH}/\text{Cd}^{2+} = 5/1$  mol/mol; c:  $-\text{COOH}/\text{Cd}^{2+} = 6/1$  mol/mol) and PMAA-*b*-PBA block copolymers (d:  $-\text{COOH}/\text{Cd}^{2+} = 3/1$  mol/mol; e:  $-\text{COOH}/\text{Cd}^{2+} = 4/1$  mol/mol; f:  $-\text{COOH}/\text{Cd}^{2+} = 5/1$  mol/mol) in *N,N'*-dimethylformamide (DMF) solution of different ratios of  $-\text{COOH}/\text{Cd}^{2+}$  ( $\text{Cd}^{2+}/\text{S}^{2-} = 1/0.6$  mol/mol, solvent:  $\text{H}_2\text{O}/\text{DMF} = 0.2/1.0$  wt/wt, reaction time: 2 h).



**Fig. S5** Fluorescence emission spectra of PMAA-stabilized CdS nanocrystals suspension dispersed in DMF of different ratios of  $-\text{COOH}/\text{Cd}^{2+}$  (a:  $-\text{COOH}/\text{Cd}^{2+} = 4$ ; b:  $-\text{COOH}/\text{Cd}^{2+} = 5$ ; c:  $-\text{COOH}/\text{Cd}^{2+} = 6$ ) with excitation at 350 nm ( $\text{Cd}^{2+}/\text{S}^{2-} = 1/0.6$  mol/mol, solvent:  $\text{H}_2\text{O}/\text{DMF} = 0.2/1.0$  wt/wt, reaction time: 2 h).



**Fig. S6** Fluorescence emission spectra of PMAA-*b*-PBA block copolymers (PMAA : PBA = 60 : 40 wt/wt) stabilized CdS nanocrystals suspension dispersed in DMF of different ratios of  $-\text{COOH}/\text{Cd}^{2+}$  (d:  $-\text{COOH}/\text{Cd}^{2+} = 3$ ; e:  $-\text{COOH}/\text{Cd}^{2+} = 4$ ; f:  $-\text{COOH}/\text{Cd}^{2+} = 5$ ) with excitation at 350 nm ( $\text{Cd}^{2+}/\text{S}^{2-} = 1/0.6$  mol/mol, solvent:  $\text{H}_2\text{O}/\text{DMF} = 0.2/1.0$  wt/wt, reaction time: 2 h)