

## Electronic Supplementary Information (ESI)

# Fast Synthesis of Versatile Nanocrystal-embedded Hydrogels Towards Sensing of Heavy Metal Ions and Organoamines

Xin Guo, Cai-Feng Wang, Yuan Fang, Li Chen, 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 Road, Nanjing 210009, People's Republic of China

### Additional characterizations:

The size of CdTe NCs was determined by an empirical fitting equation reported previously (see W. Yu, L. Qu, W. Guo and X. Peng, *Chem. Mater.* 2003, **15**, 2854–2860):

$$D = (9.8127 \times 10^{-7}) \lambda^3 - (1.7147 \times 10^{-3}) \lambda^2 + (1.0064) \lambda - (194.84)$$

where  $D$  (nm) is the size of a given nanocrystal sample, and  $\lambda$  (nm) is the wavelength of the first excitonic absorption peak of the corresponding sample.

**Table S1** UV-vis absorption and PL emission peak position, the relative size and quantum yield (QY) of CdTe NCs obtained under different time of microwave irradiation.

Time [min]	Absorption peak position [nm]	Emission peak position [nm]	Diameters of CdTe NCs [nm]	QY [%]
2	507	530	2.5	6
5	541	563	3.1	15
15	557	589	3.3	19
30	579	618	3.5	25
45	587	629	3.6	30
60	590	637	3.6	45
75	598	643	3.6	39

\* Correspondence to: S. Chen (E-mail: chensu@njut.edu.cn)

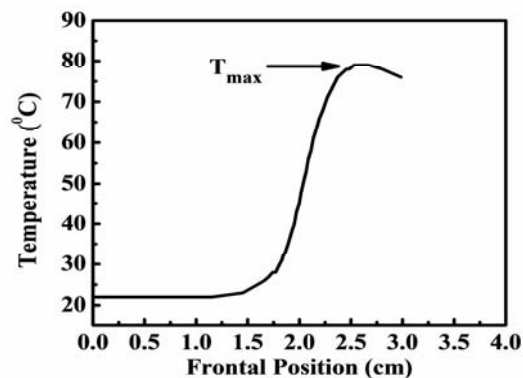


Fig. S1 Typical temperature profile of CdTe/PNMA hydrogel fabricated by FP measured by thermocouple.

As shown in Fig. S1, the  $T_{max}$  measured by thermocouple is about 79 °C. There is a temperature difference of about 8 °C between  $T_{max}$  measured by the IR thermal imager (Inset in Fig. 2) and that measured by the thermocouple which results from the difference between thermal radiation temperature and practical temperature detected respectively.

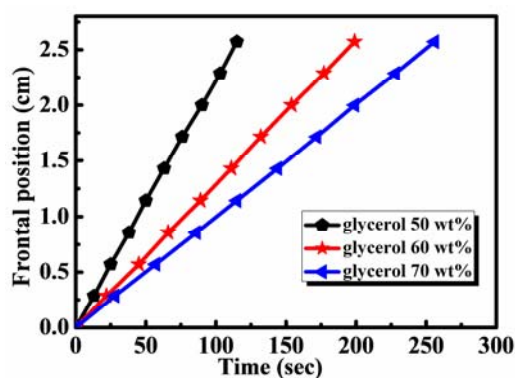


Fig. S2 Front position vs. time of FP fabricated CdTe/PNMA hydrogels containing different concentrations of glycerol.

From Fig. S2, one can see that the increase of the glycerol concentration induces the decrease of the frontal velocity, demonstrating the effectively increase of the viscosity of the system. However, when the concentration of glycerol up to 70 wt%, the complex is too viscous to handling for the next characterization.

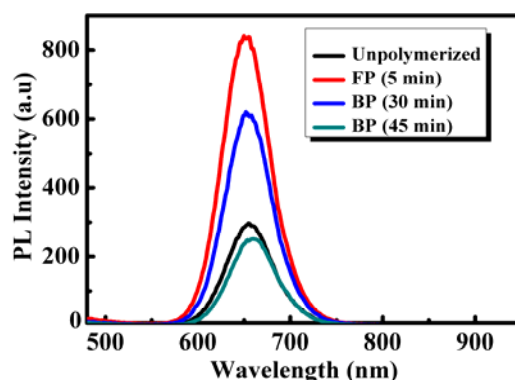
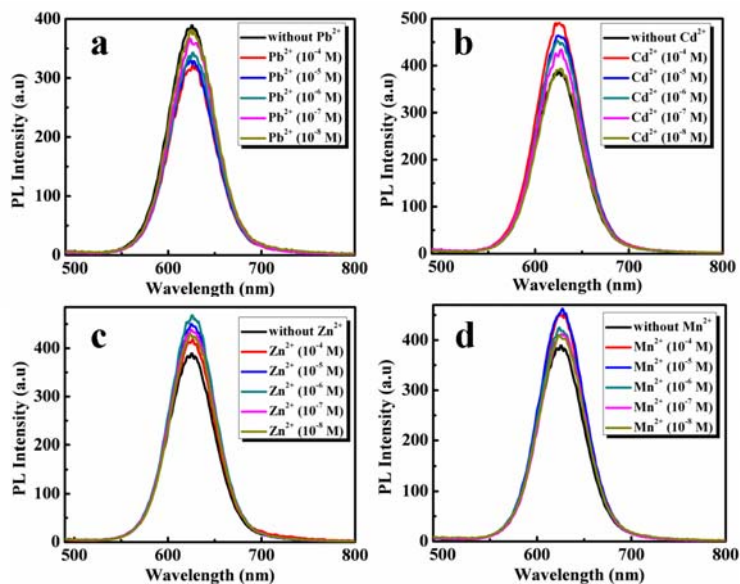


Fig. S3 Fluorescence spectra of CdTe/NMA mixture, CdTe/PNMA hydrogels fabricated via FP and BP with different times, respectively.

The conventional batch polymerization (BP) process has also been employed to fabricate CdTe/PNMA hydrogels for comparison, and we found that the optical properties of

CdTe/PNMA hydrogel fabricated by FP were superior to that by BP, as seen in Fig. S3. The BP strategy needs more time (30 min) and higher energy input for reaction and gelation than FP. As the reaction proceeds, the hydrogels fabricated by BP show slightly red-shift emission and significantly decreased PL intensity, which implies that the phase separation between CdTe NCs and PNMA polymer might occur to induce aggregation of NCs during the time-consuming polymerization process.



**Fig. S4** Fluorescence spectra of CdTe/PNMA complexes upon interaction with different concentrations of a)  $Pb^{2+}$  ion, b)  $Cd^{2+}$  ion, c)  $Zn^{2+}$  ion and d)  $Mn^{2+}$  ion.