Supporting Information

Reductant-Triggered Rapid Self-Gelation and Biological Functionalization of the Hydrogels

Dawei Chen[†], *Dongxia Wu*[‡], *Guochen Cheng*[‡], *and Hanying Zhao*[*†]

[†]Key Laboratory of Functional Polymer Materials, Ministry of Education, College of Chemistry, Nankai University; Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Tianjin 300071, China.

[‡]The Institute of Seawater Desalination and Multipurpose Utilization, SOA, Tianjin 300192, China

[*]E-mail: hyzhao@nankai.edu.cn

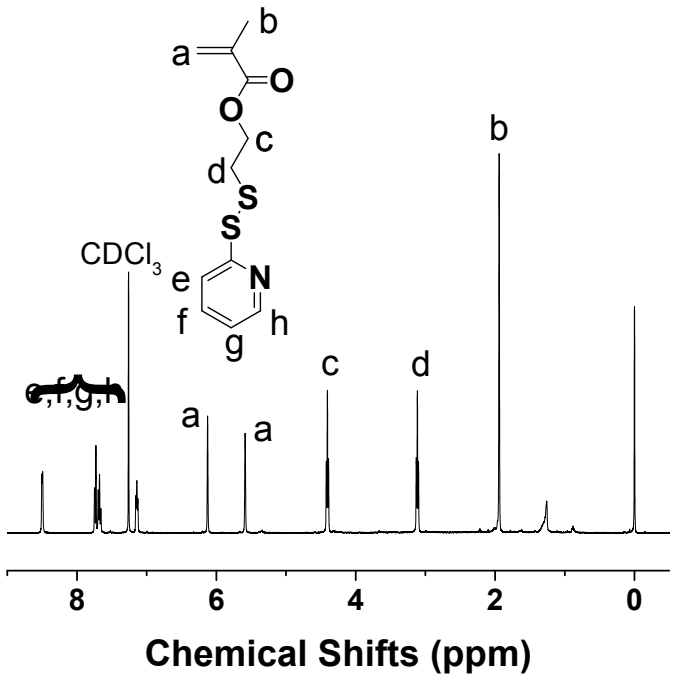

Figure S1. ^{1}H NMR of PDSM monomer.

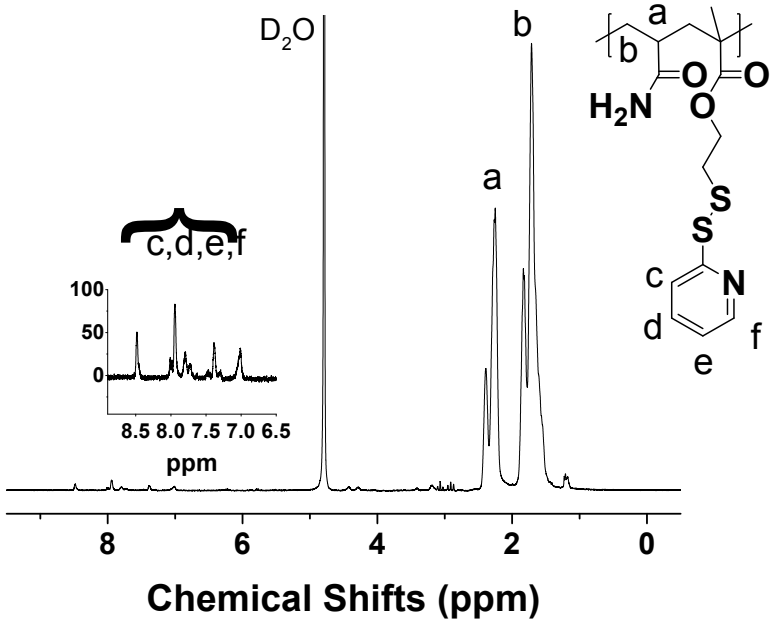

Figure S2. ^{1}H NMR of PAM-*co*-PPDSM.

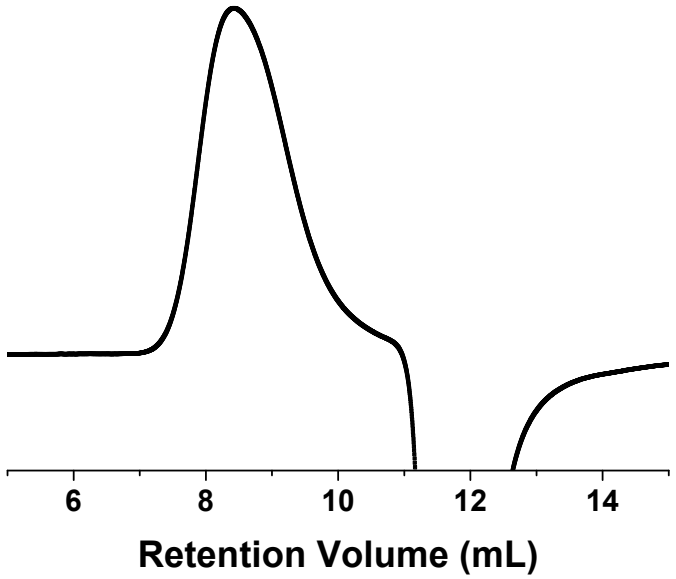

Figure S3. GPC curve of PAM-*co*-PPDSM.

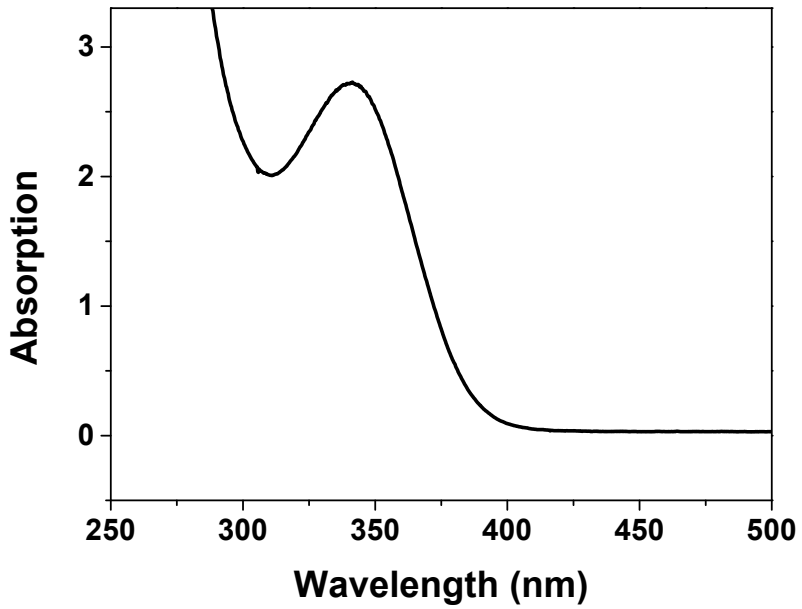

Figure S4. UV-vis absorption spectrum of an aqueous solution of PAM-*co*-PPDSM after treatment with excess DTT. The PDS content of the copolymer (C_p in mol/mg) was calculated by the following equation:

$$C_p = \frac{AV}{\varepsilon m}$$

Where A is the absorption of pyridine-2-thione at 342 nm, V is the volume of the solution in litre, ε is the molar extinction coefficient of pyridine-2-thione in water (ε=8080 $M^{-1} \cdot cm^{-1}$), and m is the mass of the copolymer in mg.

Figure S5. Photographs showing the gelation process: (a) before adding DTT; (b) 1 min after adding DTT; (c) 2 min after adding DTT. The copolymer concentration is 15%wt, and the DTT/PDS molar ratio is 1.0.

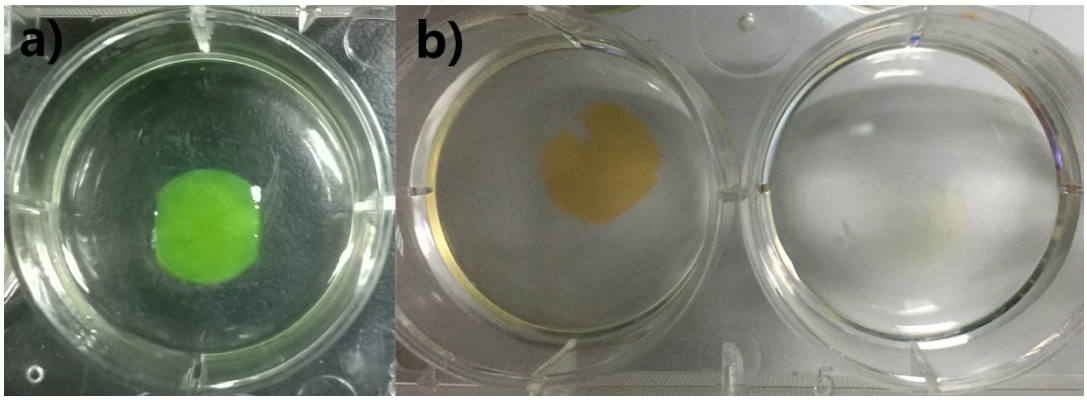

Figure S6. (a) Photograph of FITC-labelled hydrogel-GSH (15%H-0.5-GSH); (b) Photographs of FITC-labelled hydrogel-BSA (left: 15%H-0.5-BSA; right: blank hydrogel).

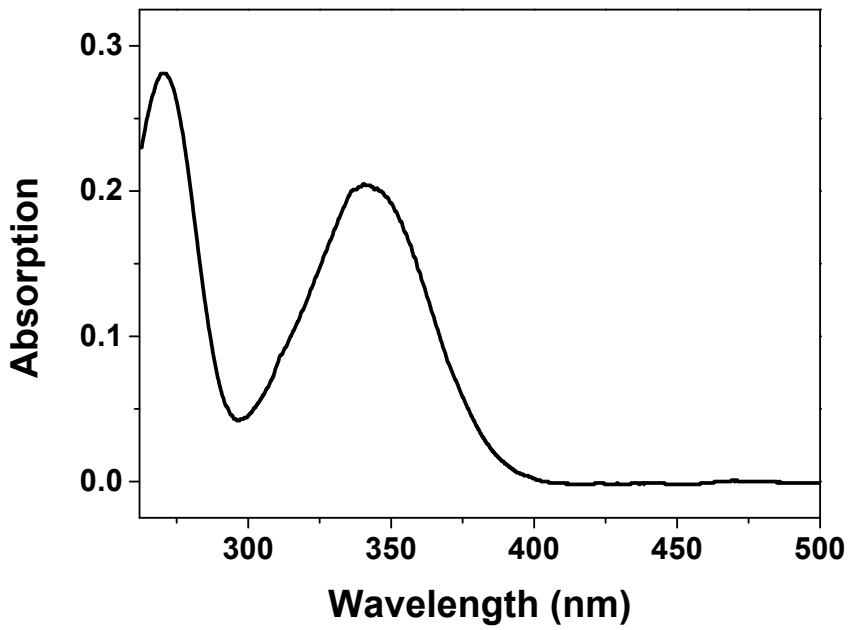

Figure S7. UV-vis absorption spectrum showing the pyridine-2-thione produced during GSH functionalization. The amount of the immobilized GSH (C_g in mol) was calculated by the following equation:

$$C_g = \frac{AV}{\varepsilon}$$

Where A is the absorption of pyridine-2-thione at 342 nm, V is the volume of the collected wash solution in litre, and ε is the molar extinction coefficient of pyridine-2-thione in water (ε=8080 $M^{-1} \cdot cm^{-1}$).

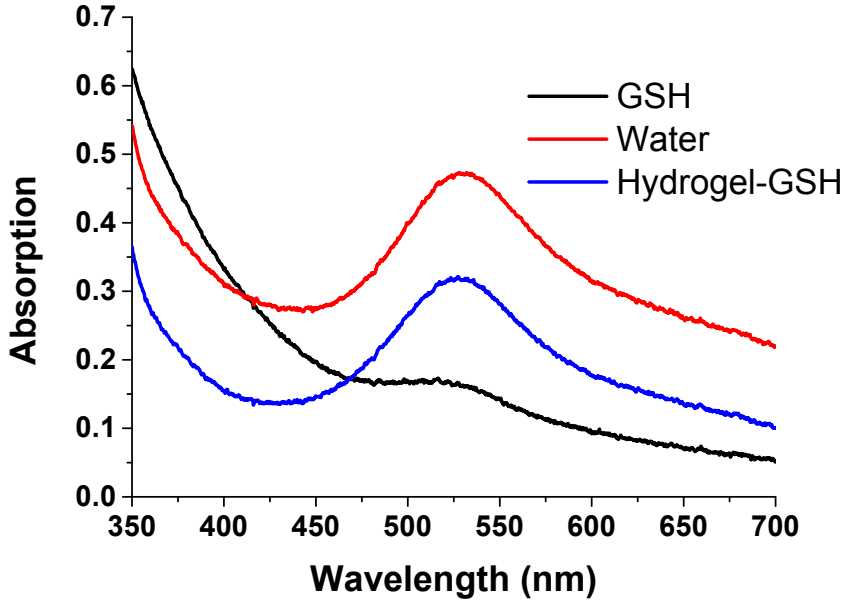

Figure S8. UV-vis absorption spectra of the DPPH scavenging assay after 11h and 20 min.

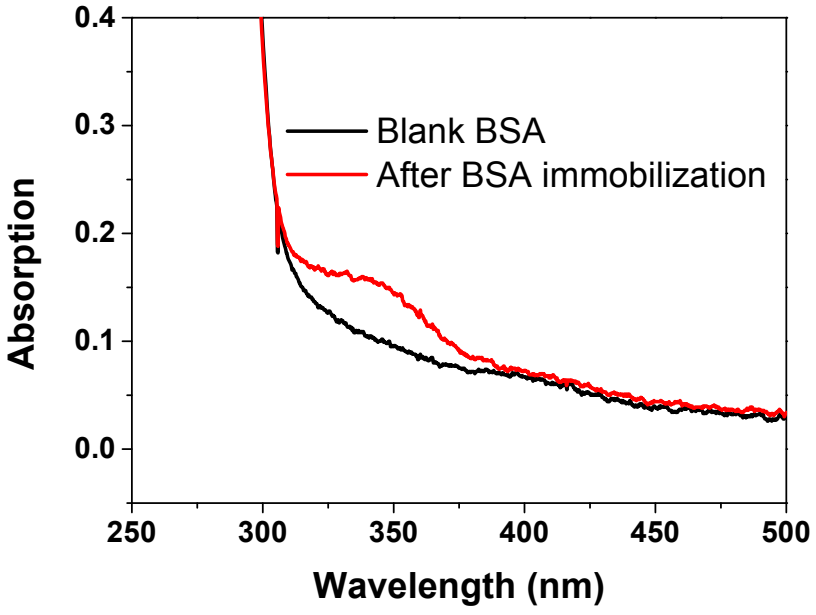

Figure S9. UV-vis absorption spectra showing the pyridine-2-thione produced during BSA functionalization. The amount of the immobilized BSA (C_b in mol) was calculated by the following equation:

$$C_b = \frac{(A - A_0)V}{\varepsilon}$$

Where A is the absorption of pyridine-2-thione at 342nm, A_0 is the absorption of the blank BSA solution at 342 nm, V is the volume of the collected wash solution in litre, and ε is the molar extinction coefficient of pyridine-2-thione in water (ε=8080 $M^{-1} \cdot cm^{-1}$).

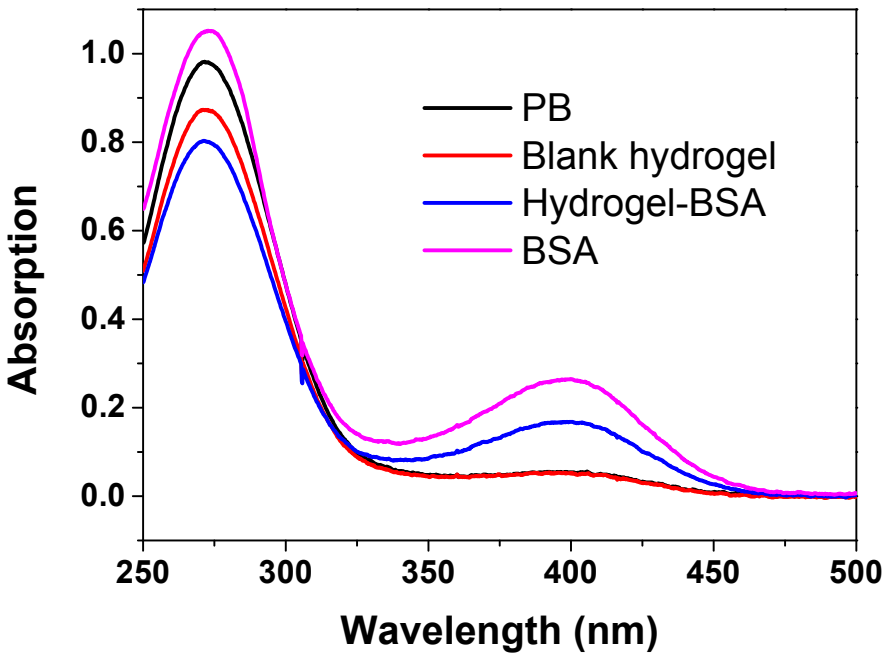

Figure S10. Typical UV-vis absorption spectra of the hydrolysis product in a BSA activity assay.