## **Supporting information**

## Benzoperylene-grafted and Cu<sup>2+</sup> chelated polymeric nanoparticles for GSH depletion and chemodynamic therapy

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Fig. S1 <sup>1</sup>H NMR spectrum (500 MHz) of BP-NH<sub>2</sub> in CF<sub>3</sub>COOD.



Fig. S2<sup>1</sup>H NMR spectrum (500 MHz) of the initiator BP-BIBB in CDCl<sub>3</sub>.



Fig. S3 MS spectrum of the initiator BP-BIBB.



Fig. S4 <sup>1</sup>H NMR spectrum (500 MHz) of the polymer BPP in D<sub>2</sub>O.



**Fig. S5** (A) UV-vis absorption and (B) fluorescence emission spectra of the initiator BP-BIBB at various concentrations (Ex: 470 nm). (C) UV-vis absorption and (D) fluorescence emission spectra of the ATRP polymer BPP at various concentrations (Ex: 488 nm).



Fig. S6. Fluorescence spectrum of the BPP polymer solid. Inset: photography of BPP under natural (left) and UV (right) light.



**Fig. S7** Photographs of the ATRP polymer (BPP, left) and the ATRP polymer chelated with Cu<sup>2+</sup> (BPC, right) under (A) natural light and (B) 365 nm UV light illumination. The sample solutions were kept in a refrigerator for 6 months before the photographs were taken.



Fig. S8. EDS spectra of the BPC NPs and the corresponding elemental mapping.



Fig. S9 (A) The hydrodynamic diameter changes of the polymeric BPC NPs before and after the incubation in PBS containing 10% fetal bovine serum (FBS) for 6 h. (B) Fluorescence emission

intensity changes of BPC before and after the incubation in PBS at 60 °C for 6 h.



Fig. S10 Fluorescence spectra changes of BPC NPs after incubation with 10% FBS fordifferent

times, and the background emission of FBS.



**Fig. S11** Photograph of the Cu<sup>2+</sup> chelated ATRP polymer BPC (left, 1 mg/mL) and BPC+ GSH (right, 1 mg/mL+10 mM).



Fig. S12 TEM image of the precipitate (BPC treated with GSH).



Fig. S13 Degradation of MB in the presence of (A) BPC + GSH +  $H_2O_2$  and (B) BPC +  $H_2O_2$ .



**Fig. S14** CLSM images of 4T1 cells incubated with BPP and BPC for different periods of time (1 hour and 6 hours). (A) Fluorescence channel and (B) bright field channel. Scale bar: 100 μm.



Fig. S15 CLSM images of 4T1 cells co-stained with BPC NPs (6 h) and (A) Hoechst 33342 and

(B) Lysosome tracker red, respectively. Scale bar: 10  $\mu m.$ 



**Fig. S16** CLSM images of 4T1 cells co-stained with AO/PI after treatments with BPP and BPC polymeric nanoparticles. Scale bar: 100 μm.



**Fig. S17** Biodistribution of BPC (measured by copper content) after 24 and 48 h incubation. BPC was intravenously injected into the 4T1 tumor-bearing mice.



Fig. S18 The content of  $Cu^{2+}$  in the blood of mice at different time points after intravenous injection of the BPC NPs.