Electronic Supplementary Information

Diselenide-crosslinked zwitterionic nanogels with dual redox-labile property for controlled drug release

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Synthesis of diselenide crosslinker: *N,N'*-bis(methacryloyl) selenocystamine (BMASC). To a solution of selenocystamine dihydrochloride (1.00 g, 3.135 mmol) in 60 mL dichloromethane, triethylamine (2.54 g, 25.101 mmol) was added with magnetic stirring. After the mixture was cooled to 0-5 °C, methacryloyl chloride (1.31 g, 104.53 mmol) was slowly added. The reaction mixture was allowed to stir at room temperature under nitrogen atmosphere for 24 h. After removing the impurities by extraction with deionized water, the organic phase was dried over anhydrous Na_2SO_4 and evaporated under reduced pressure. The raw BMASC product was purified by recrystallization from ethyl acetate/heptane (1/2 in volume) mixture (Yield: 45 wt%).

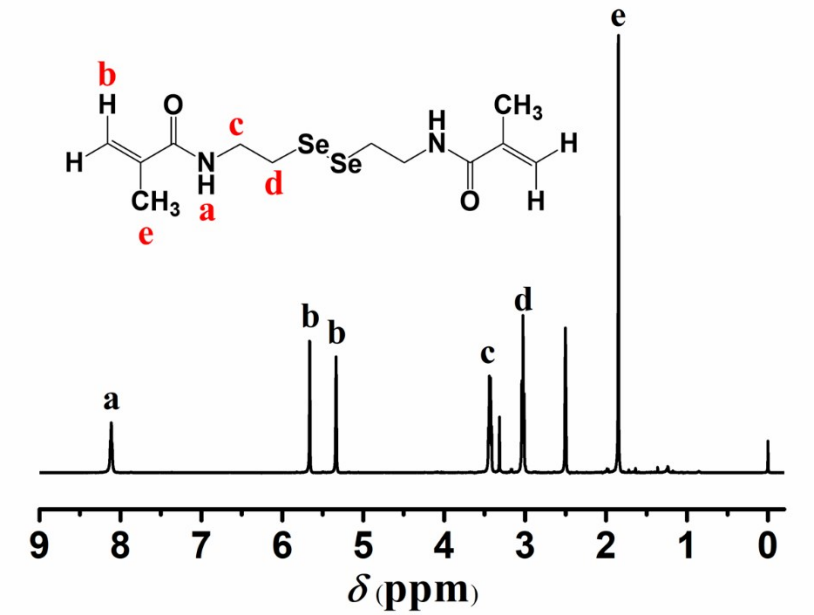

Figure S1. ^{1}H NMR of BMASC (DMSO-d_6, ppm).

According to ^{1}H NMR spectrum, the peak of *a* was assigned to the protons of imino and the peak of *e* was assigned to the protons of methyl. The peaks of *b, c,* and *d* were assigned to the methylene protons of C$\boldsymbol{H_2}$CCH$_3$CONH, CONHC$\boldsymbol{H_2}$CH$_2$SeSe, and CONHCH$_2$C$\boldsymbol{H_2}$SeSe, respectively.

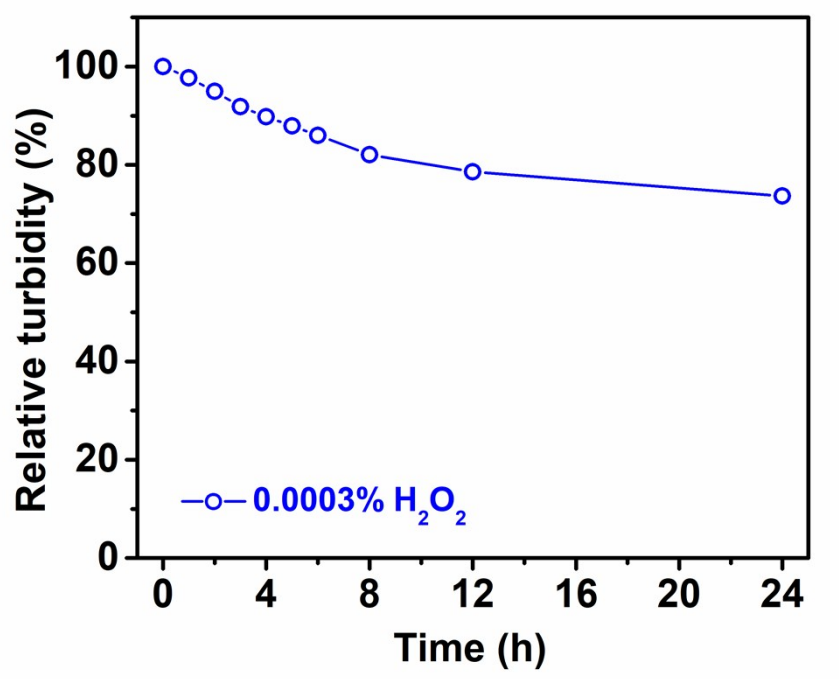

Figure S2. Changes of the relative turbidity of the P(MPC-*Se*-*Se*-MPC)-25 nanogels in 0.0003% H_2O_2.

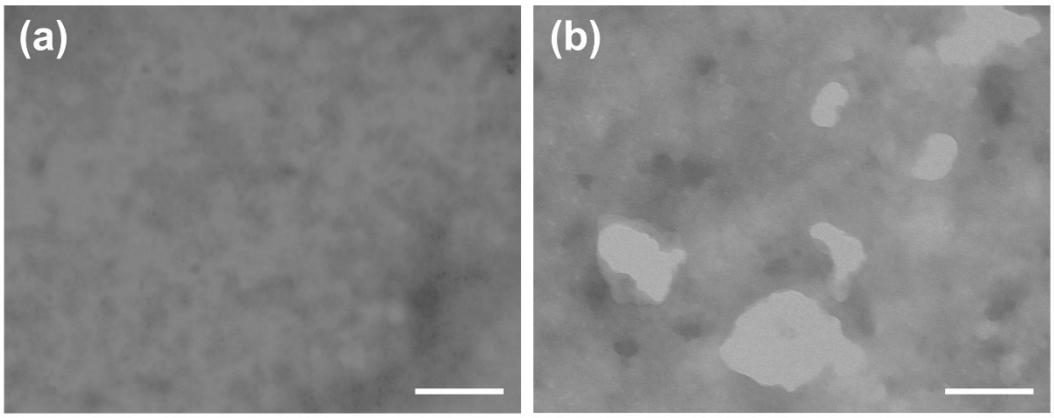

Figure S3. TEM images of P(MPC-*Se*-*Se*-MPC)-25 nanogels after degradation in (a) 0.1% H_2O_2 and (b) 10 mM GSH. Scale bars: 500 nm.

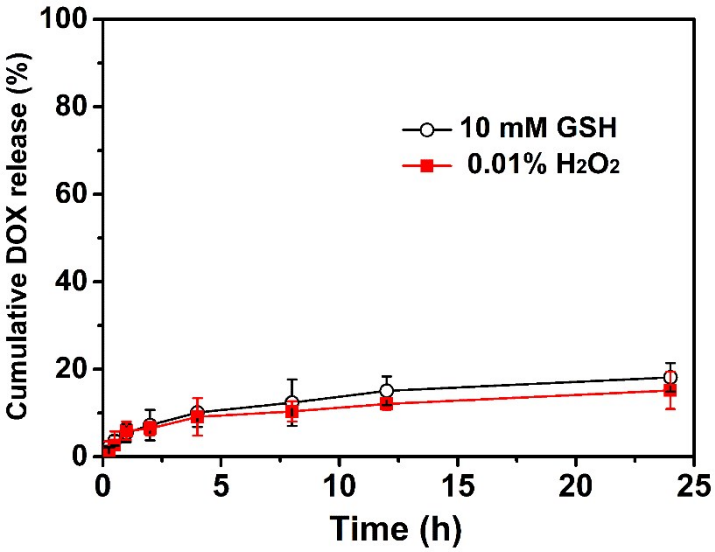

Figure S4. DOX release profiles of DOX-loaded P(MPC-*co*-MPC) nanogels at 37 °C in 7.4 PBS with 10 mM GSH, or 0.01% H_2O_2.

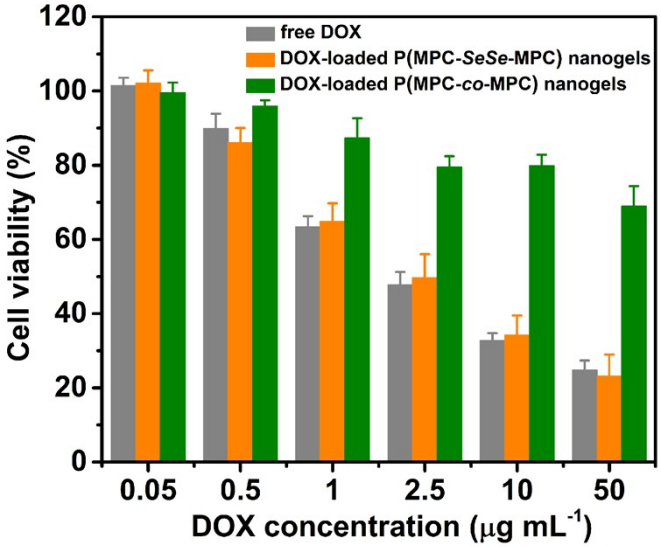

Figure S5. Cell viability of A549 cells incubated with DOX-loaded P(MPC-*Se*-*Se*-MPC) nanogels, DOX-loaded P(MPC-*co*-MPC) nanogels and free DOX for 48 h.