Supporting Information

Construction of Smart Glutathione Peroxidase Mimic with Temperature Responsive Activity based on block Copolymer

Yanzhen Yin, Liang Wang, Haiyan Jin, Chunyan Lv, Shuangjiang Yv, Xin Huang, Quan Luo, Jiayun Xu, Junqiu Liu* [a]

Synthesis of PPAM

The typical procedure of **PPAM** was as follows: NIPAM (256mg, 3.6mmol), Me_6TREN (6.9mg, 0.03 mmol), water (2.0mL) and DMF (2.0mL) were introduced into a Schlenk tube equipped with a magnetic stirring bar, followed by two freeze-pump-thaw cycle. Then, CuBr (4.3mg, 0.03mmol) was added under nitrogen and followed by two freeze-pump-thaw cycles. Finally, the initiator **PNIPAM-Br** (241.1mg, 0.03mmol) was added to the Schlenk tube via a syringe to start the polymerization. The mixture was stirred for 10h at room temperature. Then the mixture was exposed to air to terminate the polymerization and dialyzed against water for 2d, a colorless polymer was obtained after the aqueous solution was freeze-dried. GPC analysis of the polymer revealed a Mn of 8899 and a polydispersity, Mw/Mn, of 1.22. The degree of polymerization (DPs) of **PAM** was estimated to be 12. The block copolymer was denoted as **PPAM.**

Synthesis of PPAM-Te

The typical procedure of **PPAM-Te** was as follows: NIPAM (256mg, 3.6mmol), Me_6TREN (6.9mg, 0.03mmol), monomer **1** (107.9mg, 0.36mmol) water (2.0mL) and DMF (2.0mL) were introduced into a Schlenk tube equipped with a magnetic stirring bar, followed by two freeze-pump-thaw cycle. Then, CuBr (4.3mg, 0.03mmol) was added under nitrogen and followed by two freeze-pump-thaw cycles. Finally, the initiator **PNIPAM-Br** (241.1mg, 0.03mmol) was added to the Schlenk tube via a syringe to start the polymerization. The mixture was stirred for 10h at room temperature. Then the mixture was exposed to air to terminate the polymerization and dialyzed against water for 2d, a colorless polymer was obtained after the aqueous solution was freeze-dried. GPC analysis of the polymer revealed a Mn of 8940 and a polydispersity, Mw/Mn, of 1.22. The concentration of the catalytic center tellurium was

2.5×10^{-5}mmol/mg, was estimated according to the method reported by our group previous. The block copolymer was denoted as **PPAM-Te.**

Synthesis of PPAM-N

The typical procedure of **PPAM-N** was as follows: NIPAM (256mg, 3.6mmol), Me_6TREN (6.9mg, 0.03mmol), monomer **2** (146.5mg, 0.36mmol) water (2.0mL) and DMF (2.0mL) were introduced into a Schlenk tube equipped with a magnetic stirring bar, followed by two freeze-pump-thaw cycle. Then, CuBr (4.3mg, 0.03mmol) was added under nitrogen and followed by two freeze-pump-thaw cycles. Finally, the initiator **PNIPAM-Br** (241.1mg, 0.03mmol) was added to the Schlenk tube via a syringe to start the polymerization. The mixture was stirred for 10h at room temperature. Then the mixture was exposed to air to terminate the polymerization and dialyzed against water for 2d, a colorless polymer was obtained after the aqueous solution was freeze-dried. GPC analysis of the polymer revealed a Mn of 9172 and a polydispersity, Mw/Mn, of 1.25. The concentration of quaternary ammonium salt in the polymer was estimated to be 1.85×10^{-4}mmol/mg according to the NMR analysis. The block copolymer was denoted as **PPAM-N.**

Synthesis of PPAM-CD

The typical procedure of **PPAM-CD** was as follows: NIPAM (256mg, 3.6mmol), Me_6TREN (6.9mg, 0.03mmol), monomer **3** (520.6mg, 0.36mmol) water (2.0mL) and DMF (2.0mL) were introduced into a Schlenk tube equipped with a magnetic stirring bar, followed by two freeze-pump-thaw cycle. Then, CuBr (4.3mg, 0.03mmol) was added under nitrogen and followed by two freeze-pump-thaw cycles. Finally, the initiator **PNIPAM-Br** (241.1mg, 0.03mmol) was added to the Schlenk tube via a syringe to start the polymerization. The mixture was stirred for 10h at room temperature. Then the mixture was exposed to air to terminate the polymerization and dialyzed against water for 2 d, a colorless polymer was obtained after the aqueous solution was freeze-dried. GPC analysis of the polymer revealed a Mn of 14840 and a polydispersity, Mw/Mn, of 1.33. The concentration of CD in the polymer was estimated to be 3.2×10^{-4} mmol/mg according to the NMR analysis. The block copolymer was denoted as **PPAM-CD.**