Supplementary Materials

For

Selective detection of folic acid using a water-stable fluorescent $CsPbBr_3/Cs_4PbBr_6$ perovskite nanocrystal probe

Wen-Zhi She, Rui-Xian Zhao, Jin-Zhou Liu, Hai-Chi Zhang, Rong Sheng Li, Meng-Ting Liu, Chuan-Hua Zhou, Jian Ling, Qiue Cao*

Key Laboratory of Medicinal Chemistry for Natural Resource (Yunnan University), Ministry of Education, National Demonstration Center for Experimental Chemistry and Chemical Engineering Education (Yunnan University), School of Chemical Science and Technology, Yunnan University, Kunming 650091, China

*Corresponding authors. Email: lingjian@ynu.edu.cn (J. Ling); Tel, +86-871-65033719; Fax, +86-871-65033679

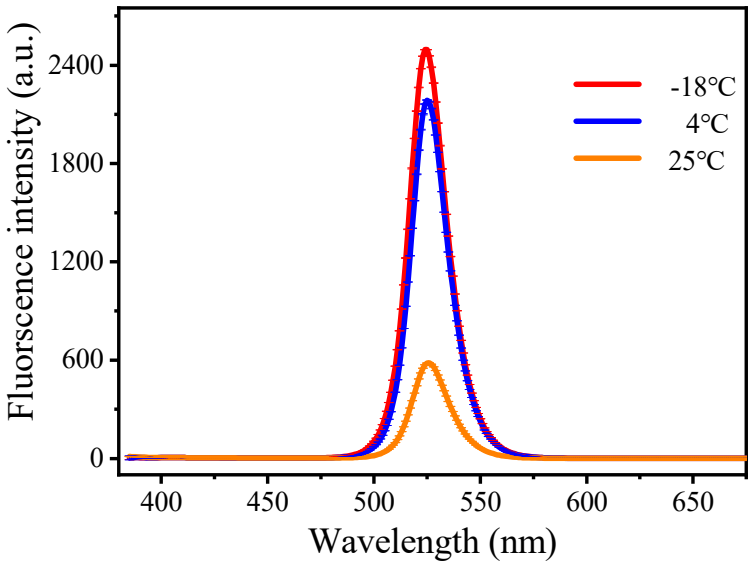

Figure S1. Effect of precursor reaction temperature on fluorescence intensity of $CsPbBr_3/Cs_4PbBr_6$ PNCs. Experimental conditions: Synthetic precursors: CsBr (45.4 mM), $PbBr_2$ (45.4 mM), N-6-trifluoroacetyl-L-lysine (4.54 mM), reaction time: 2.5 h, reaction temperature: 25 °C, 4°C, -18°C; Synthesis of $CsPbBr_3/Cs_4PbBr_6$ PNCs: OLA (250 μL), precursor (1.375 mL) Reaction time: 20 min, reaction temperature: 25°C.

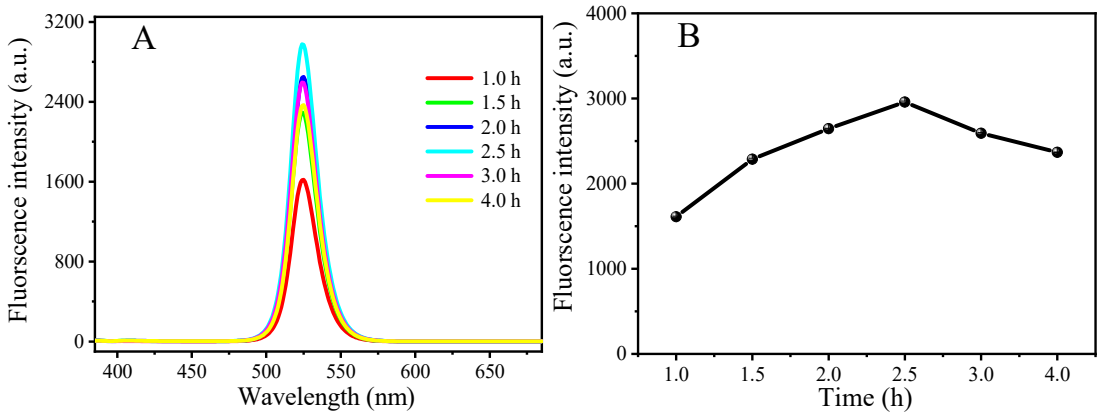

Figure S2. The effect of precursor reaction time on the fluorescence intensity of $CsPbBr_3/Cs_4PbBr_6$ PNCs (A and B). Experimental conditions: Synthetic precursors: CsBr (45.4 mM), $PbBr_2$ (45.4 mM), N-6-trifluoroacetyl-L-lysine (4.54 mM), reaction time: 1.0 h, 1.5 h, 2.0 h, 2.5 h, 3.0 h, 4.0 h, reaction temperature: -18 °C; synthesis of $CsPbBr_3/Cs_4PbBr_6$ PNCs: OLA (250 μL), precursor (1.375 mL), reaction time: 20 min, reaction temperature: 25 °C.

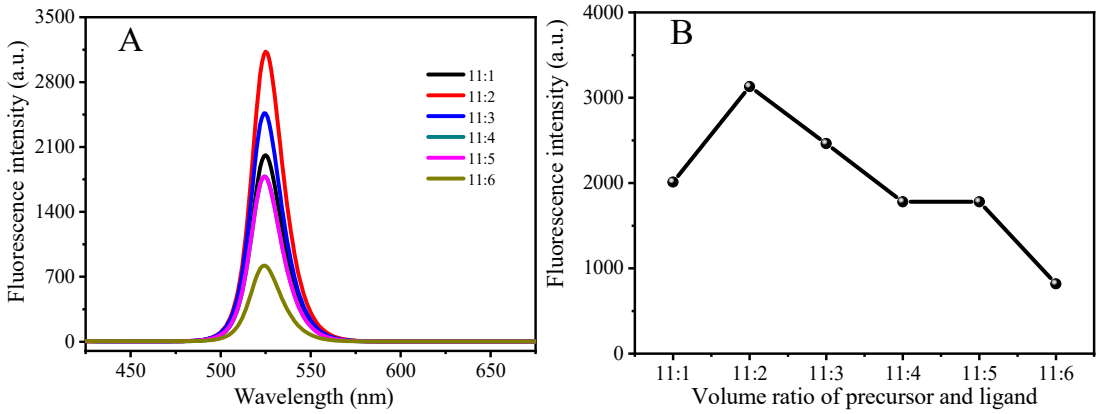

Figure S3. Effect of volume ratio of precursor to ligand on the fluorescence intensity of $CsPbBr_3/Cs_4PbBr_6$ PNCs (A and B). Experimental conditions: Synthetic precursors: CsBr (45.4 mM), $PbBr_2$ (45.4 mM), N-6-trifluoroacetyl-L-lysine (4.54 mM), reaction time: 2.5 h, reaction temperature: -18 °C ; Synthesis of $CsPbBr_3/Cs_4PbBr_6$ PNCs: OLA (125 µL, 250 µL, 375 µL, 500 µL, 625 µL, 750 µL), precursor (1.375 mL) Reaction time: 20 min, reaction temperature: 25°C.

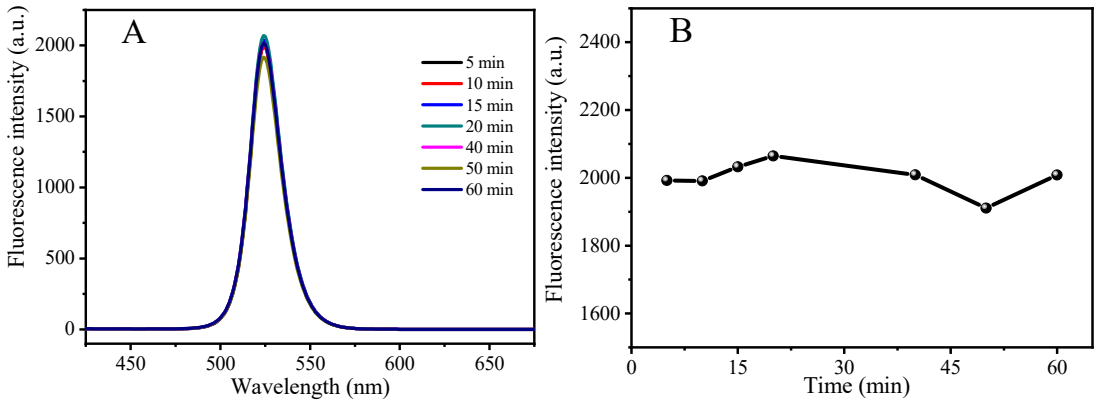

Figure S4. The effect of reaction time of precursor and ligand on the fluorescence intensity of $CsPbBr_3/Cs_4PbBr_6$ PNCs (A and B). Experimental conditions: Synthetic precursors: CsBr (45.4 mM), $PbBr_2$ (45.4 mM), N-6-trifluoroacetyl-L-lysine (4.54 mM), reaction time: 2.5 h, reaction temperature: -18 °C ; Synthesis of $CsPbBr_3/Cs_4PbBr_6$ PNCs: OLA (250 µL), precursor (1.375 mL) Reaction time: 5, 10, 15, 20, 40, 50 and 60 min, reaction temperature: 25°C

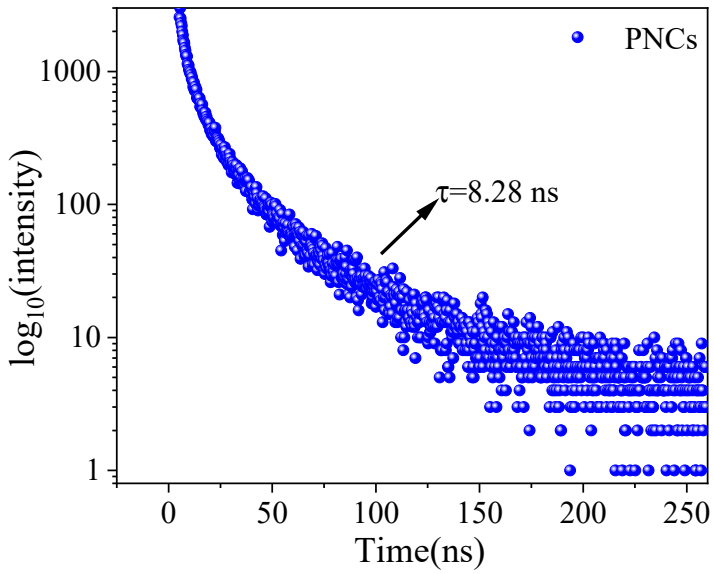

Figure S5. Fluorescence lifetime map of $CsPbBr_3/Cs_4PbBr_6$ PNCs. Experimental conditions: Synthetic precursors: CsBr (45.4 mM), $PbBr_2$ (45.4 mM), N-6-trifluoroacetyl-L-lysine (4.54 mM), reaction time: 2.5 h, reaction temperature: -18 °C ; Synthesis of $CsPbBr_3/Cs_4PbBr_6$ PNCs: OLA (250 μL), precursor (1.375 mL) Reaction time: 20 min, reaction temperature: 25°C.

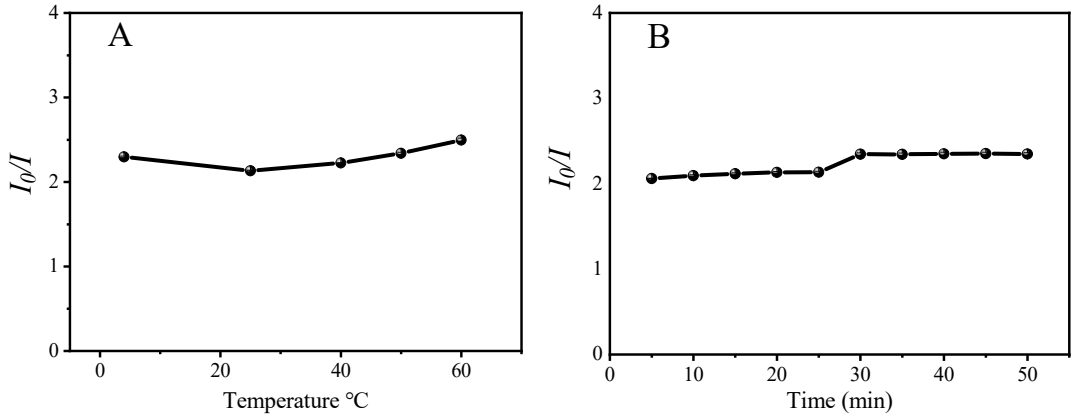

Figure S6. Optimization of temperature (A) and time (B) for detection of FA by $CsPbBr_3/Cs_4PbBr_6$ PNCs. Experimental conditions: the concentration of $CsPbBr_3/Cs_4PbBr_6$ PNCs (0.156 mmol, in terms of Cs atoms), the concentration of FA is 200 μM; (A) reaction temperature: 4-60 ° C; response time: 15 min; (B) reaction temperature: 25 ℃, response time: 5-50 min.

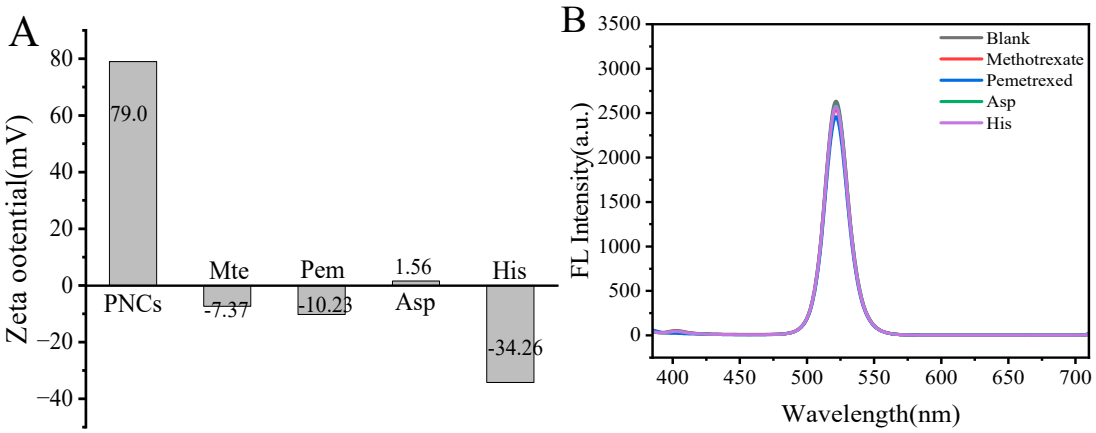

Figure S7. Zeta potential of different molecules and the PNCs (A); Effects of four similar molecules on the fluorescence intensity of the PNCs (B). Experimental conditions: The concentration of the four molecules was 200 μM.