

Supporting Information

Cyanine dye-assembled composite upconversion nanoparticles for the sensing and cell imaging of nitrite based on a single particle imaging method

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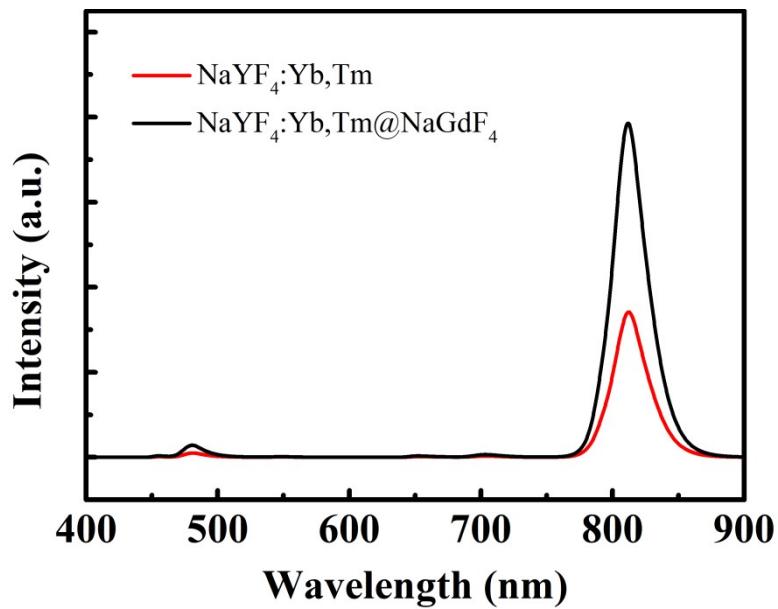


Fig. S1. Comparison of the luminous intensity of $\text{NaYF}_4:\text{Yb,Tm}$ and $\text{NaYF}_4:\text{Yb,Tm}@\text{NaGdF}_4$.

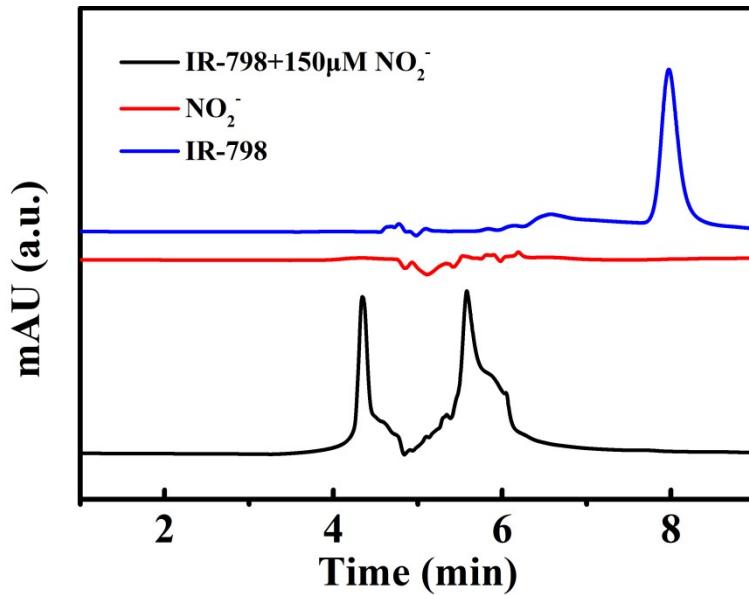


Fig. S2. Chromatographic detection results of dye IR-798 before and after adding $150 \mu\text{M} \text{NO}_2^-$

(Liquid chromatograph conditions: the mobile phase is methanol: water=90:10; the flow rate is 0.600 mL/min).

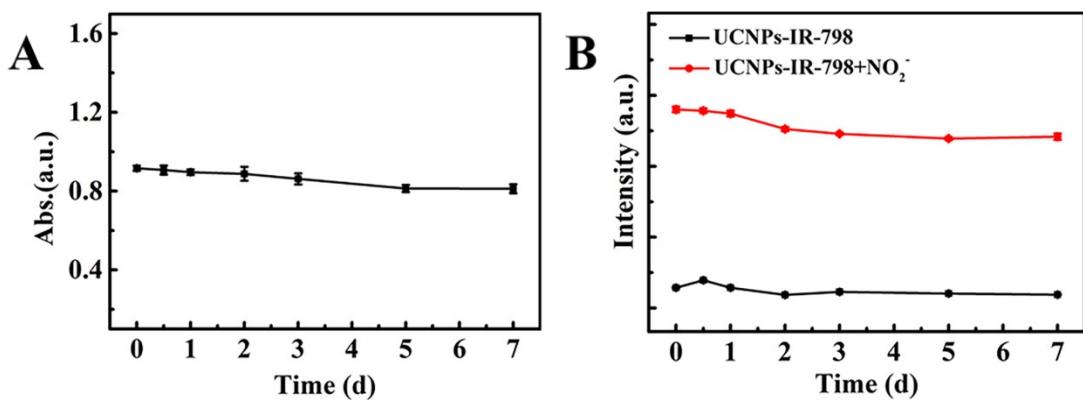


Fig. S3. (A) The graph of the absorbance of the dye IR-798 over time. (B) The graph of the luminous intensity of the probe UCNPs-IR-798 over time, and the recovery of the probe's luminous intensity after adding 100 μ M NO_2^- ($C_{\text{UCNPs}}=0.12$ mg/mL, $C_{\text{IR-798}}=0.044$ mg/mL).

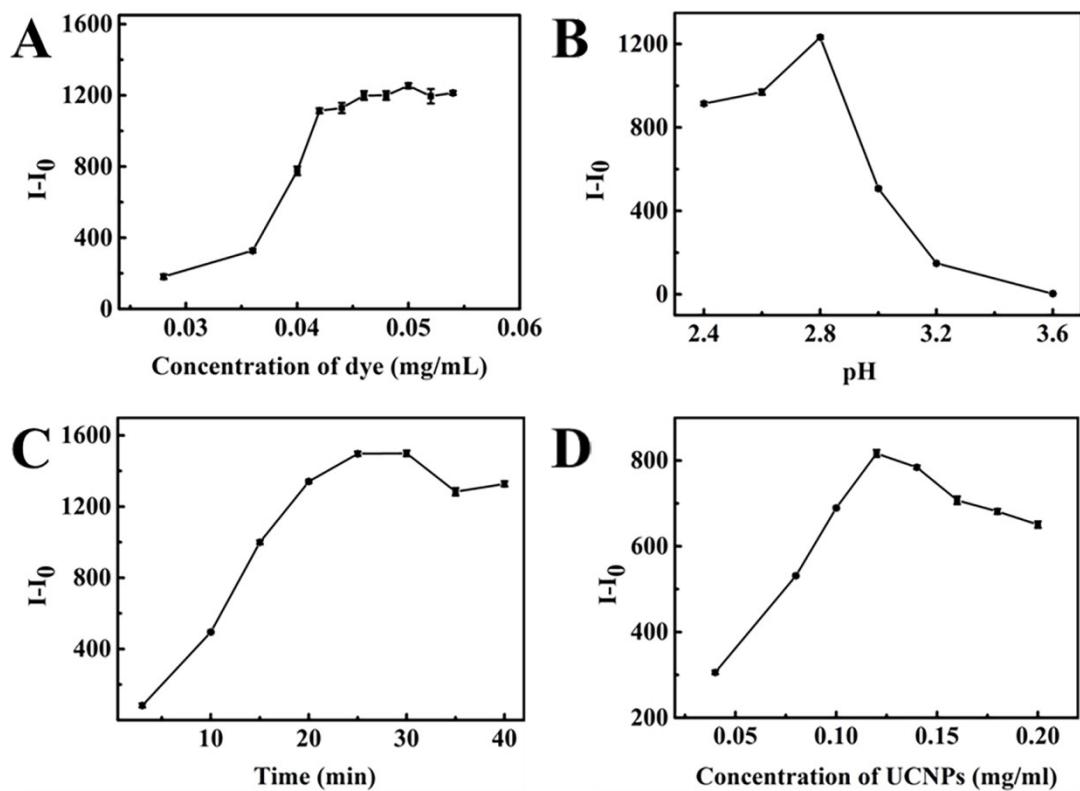


Fig. S4. (A) Influence of the dye concentration on the luminous intensity of UCNPs. (B) Changes in the luminescence intensity of UCNPs in buffer solutions with different pH values. (C) The change of luminescence intensity under different reaction times between UCNPs-IR-798 and

NO_2^- . (D) The effect of different UCNPs concentration (I_0 and I respectively represent the change in luminous intensity before and after the addition of NO_2^-).

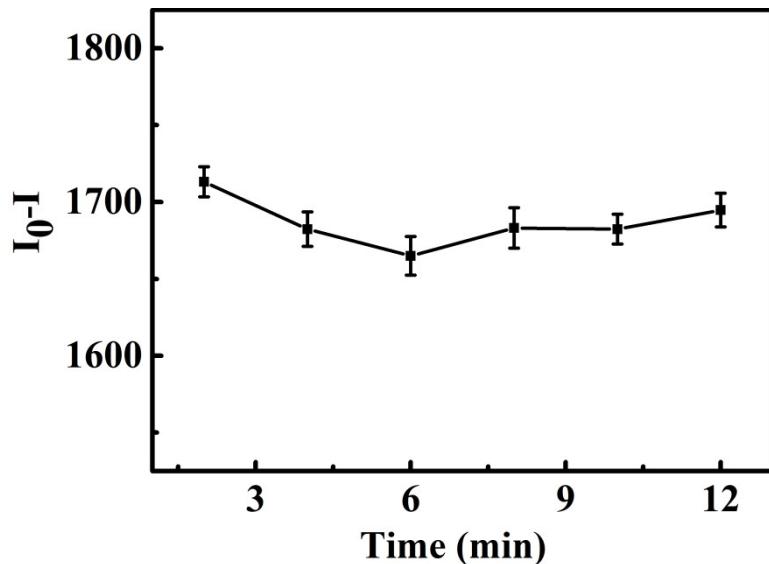


Fig. S5. Effect of the probe formation time (I_0 and I respectively represent the change in luminous intensity before and after the presence of IR-798).

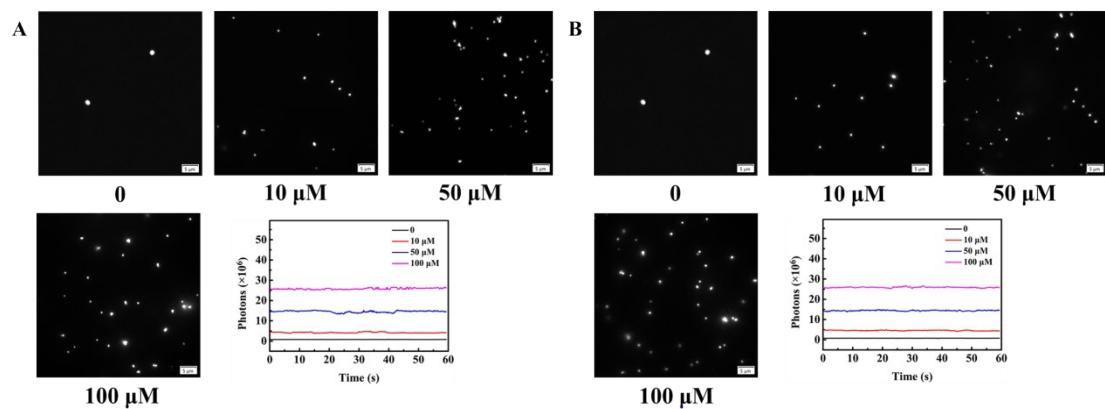


Fig. S6. Luminous images and intensity traces of tap water (A) and river water (B) under different NO_2^- concentrations.

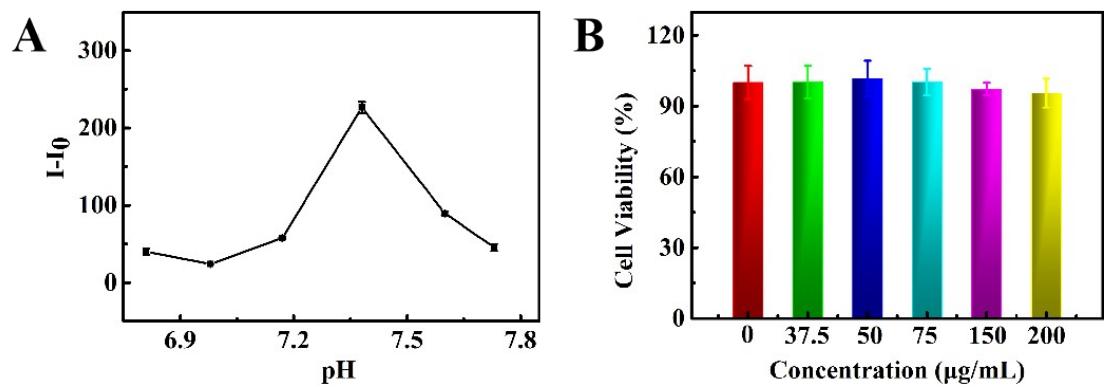


Fig. S7. (A) Upconversion luminous intensity changes in the pH range of 6.8-7.8. (B) Cell survival rate under different UCNPs-IR-798 probe concentrations.