Supporting Information Available

A visual and reversible assay for temperature using thioflavin T-doped lanthanide/nucleotide coordination polymers

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Materials and instruments

Thioflavin T was obtained from the Sigma Chemical Company. Europium (III) nitrate hexahydrate was purchased from Diyang Chemical Co. Ltd (Shanghai, China). Guanosine 5'-monophosphate disodium salt (GMP) was purchased from Sangon Biotech Co. Ltd (Shanghai, China). All chemicals used in this work were of analytical reagent and obtained from commercial sources and directly used without additional purification. Ultrapure water (>18 MΩ•cm) was used throughout.

Fluorescence experiments were carried out using a Hitachi F-7000 Fluorescence Spectrophotometer with a 150 W xenon lamp (Hitachi, Japan). Samples for absorption and emission measurements were conducted in 1 cm × 1 cm quartz cuvette. The slit width of excitation and emission were both 5 nm, and the scan speed was set as 1200 nm/min. The excitation wavelength used was 425 nm for the emission spectra. Transmission electron microscopy (TEM) images were obtained using a JEOL-2100F electron microscope (JEOL, Tokyo, Japan). The elemental analysis was performed with energy-dispersive X-ray spectrometer (EDX, X-Max Oxford, U.K.). Photographs were taken with a digital camera (Tokyo, Japan).

Preparation of ThT/Eu/GMP coordination polymers.

ThT/Eu/GMP coordination polymers (ThT/Eu/GMP CPs) were prepared according to the reported method with minor modifications. Briefly, 0.5 mL of $Eu(NO_3)_3$ aqueous solution (15 mM) and 0.5 mL of ThT aqueous solution (60 μM) were added to 0.5 mL of GMP disodium salt water solution (60 mM); green precipitate was formed immediately. The green precipitate was collected by centrifugation at 7000 rpm for 1 min. To remove unreacted reactants, we washed the precipitate with ultrapure water for several times. Finally, the obtained ThT/Eu/GMP CPs were dispersed in 1.5 mL of Milli-Q water to form a ThT/Eu/GMP CPs solution for further experiments.

Assay for temperature using ThT/Eu/GMP coordination polymers.

The ThT/Eu/GMP CPs solution was placed in a sealed 1 cm × 1 cm quartz cuvette and incubated in water-bath for 5 min at different temperatures from 25°C to 75°C. Then, the fluorescence emission spectra of corresponding mixed solution were recorded quickly. The fluorescent spectrum of the ThT/Eu/GMP CPs solution was consecutively recorded every 2.5°C.

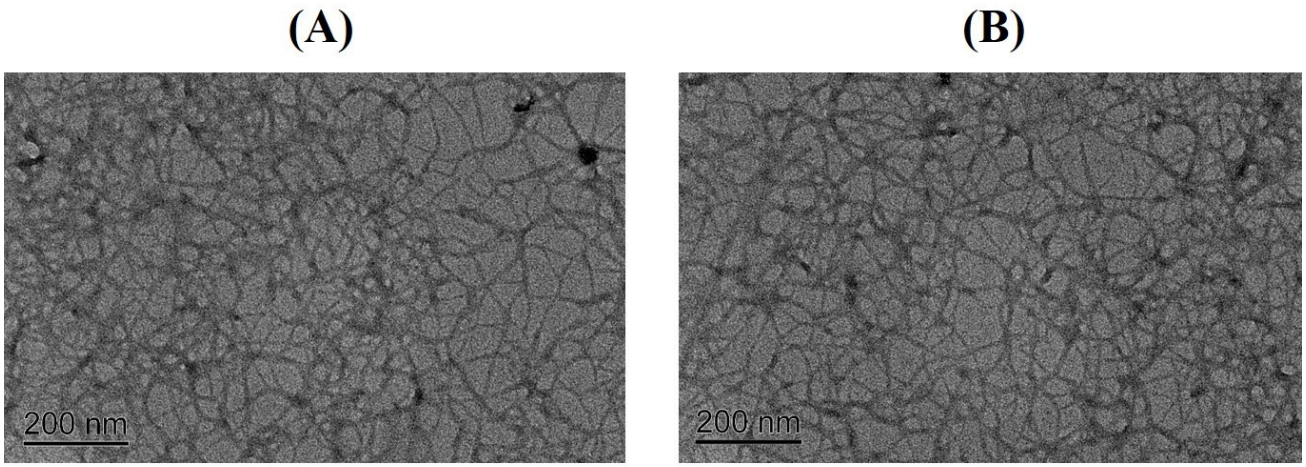

Figure S1. TEM images of (A) Eu/GMP CPs solution and (B) ThT/Eu/GMP CPs solution.

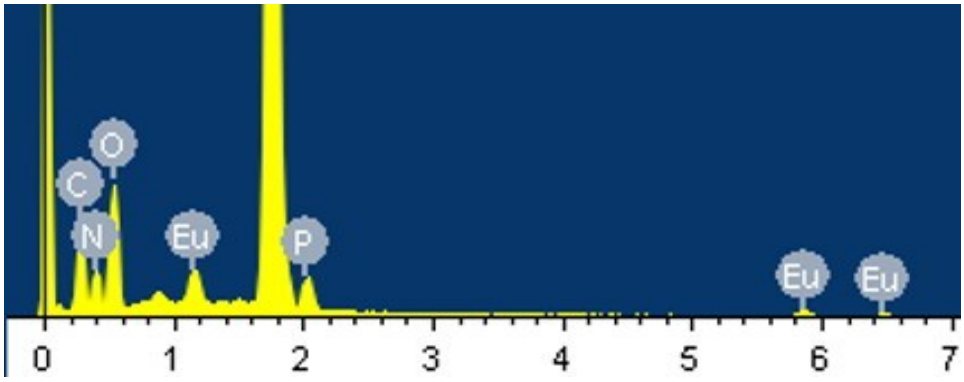

Figure S2. Energy-dispersive X-ray (EDX) spectra of ThT/Eu/GMP CPs.

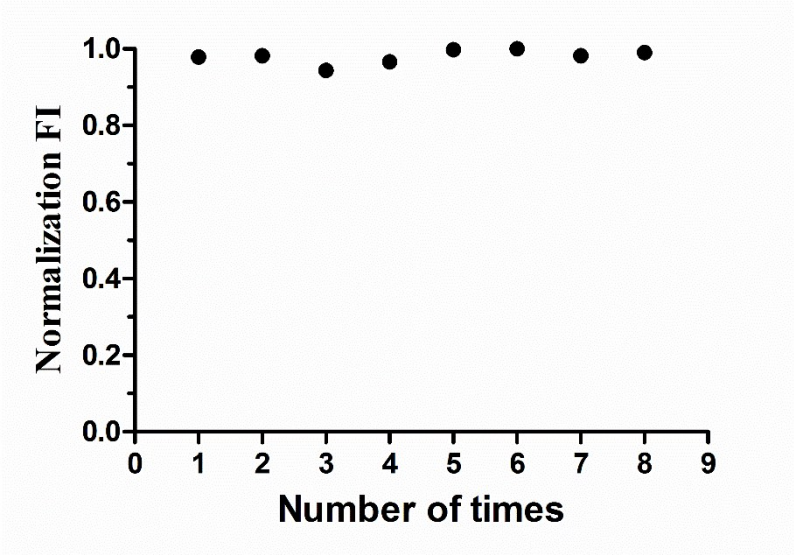

Figure S3. 8 repetitive measurements with 25°C was used for investigating the reproducibility and stability of ThT/Eu/GMP CPs solution response.

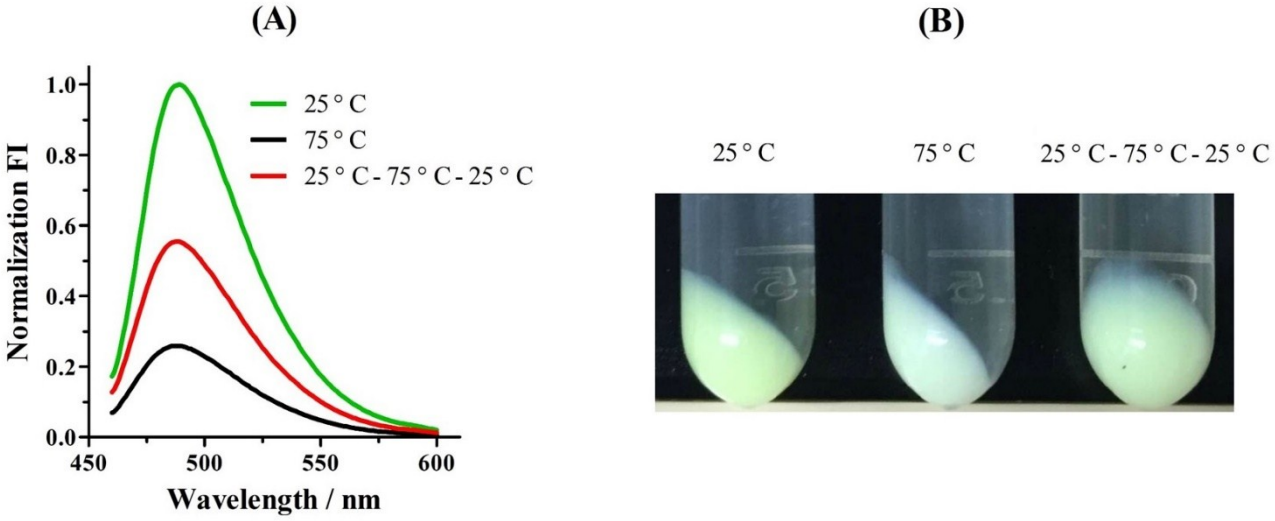

Figure S4. (A) Fluorescence responses of ThT/Eu/GMP CPs solution to different heat treatments. (B) The photograph of the centrifuged products of ThT/Eu/GMP CPs solution challenged with different heat treatments.

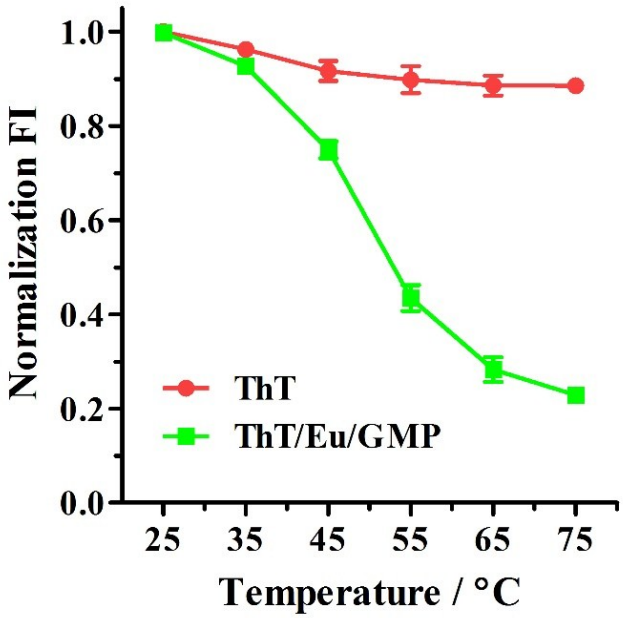

Figure S5. Fluorescence responses of ThT (red line) and ThT/Eu/GMP CPs solution (green line) to different temperatures from 25 °C to 75 °C.