

Reversible luminescence switching accompanied by assembly–disassembly of metallosupramolecular amphiphiles based on platinum(II) complex

Nijuan Liu, Baoyan Wang, Weisheng Liu and Weifeng Bu*

Key Laboratory of Nonferrous Metals Chemistry and Resources Utilization of Gansu Province, State Key Laboratory of Applied Organic Chemistry, and College of Chemistry and Chemical Engineering, Lanzhou University, Lanzhou City, Gansu Province, China, Fax: +86 931 8912582; Tel: +86 931 8915151; E-mail: buwf@lzu.edu.cn

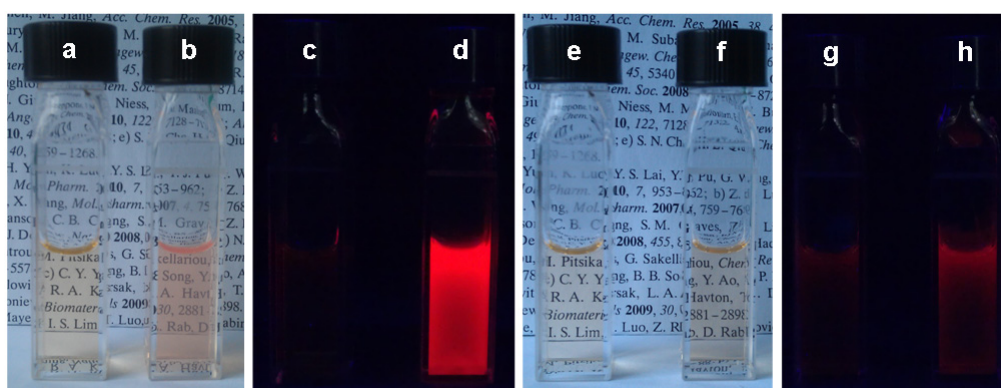


Fig. S1 Photographs of **1** (a, c, e and g), SDS-1 (b and d) and the mixture of **1** and SDBS (f and h) with a molar ratio of 1:1. c, d, g and h were taken under the UV irradiation at 365 nm.

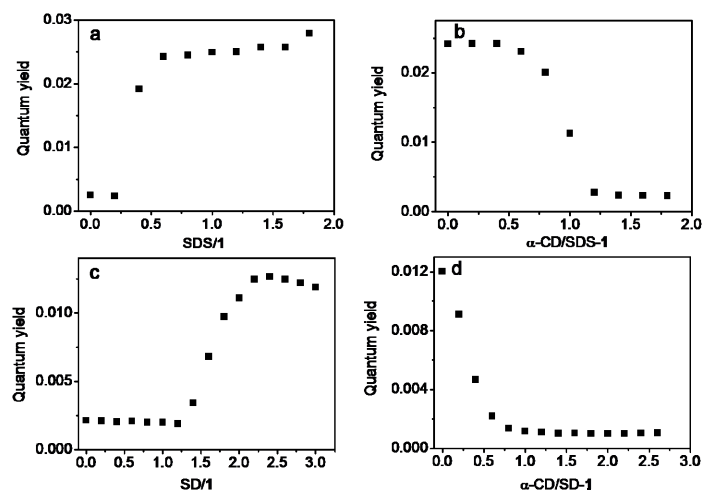


Fig. S2 (a) Emission quantum yield changes of **1** (0.2 mmol/L) upon titration with SDS (SDS/1 = 0, 0.2, 0.4, 0.6, 0.8, 1.0 1.2, 1.4, 1.6 and 1.8). (b) Emission quantum yield changes of SDS-1 (0.2 mmol/L) upon titration with α -CD (α -CD/SDS-1 = 0, 0.2, 0.4, 0.6, 0.8, 1.0 1.2, 1.4, 1.6 and 1.8). (c) Emission quantum yield changes of **1** (0.4 mmol/L) upon titration with SD (SD/1 = 0, 0.2, 0.4, 0.6, 0.8, 1.0 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4, 2.6, 2.8 and 3.0). (d) Emission quantum yield changes of SD-1 (0.4 mmol/L) upon titration with α -CD (α -CD/SD-1 = 0, 0.2, 0.4, 0.6, 0.8, 1.0 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4 and 2.6).

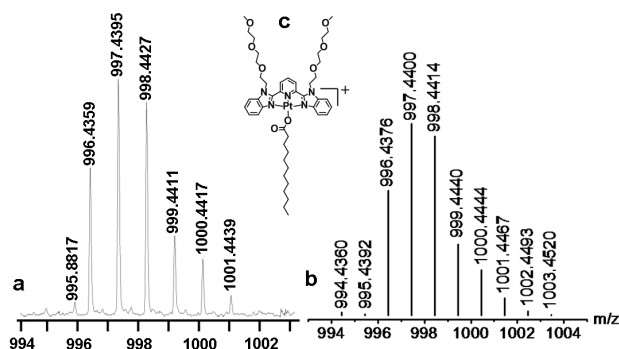


Fig. S3 The experimental (a) and theoretical (b) ESI-MS spectra of the **1** solution with SD at an SD/**1** molar ratio of 1:1. (c) The signal is assigned to the chemical structure of [**1** + dodecanoate - 2Cl]⁺.

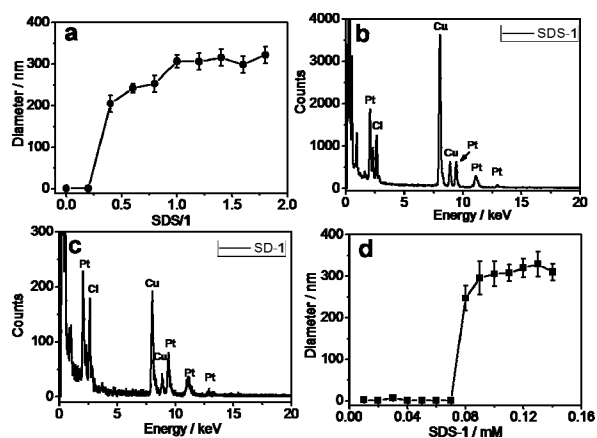


Fig. S4 (a) The change of the average hydrodynamic diameters (Dh) of **1** (0.2 mmol/L) upon titration with SDS = 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6 and 1.8). (b) EDX spectrum of SDS-1 and (c) EDX spectrum of SD-1. (d) Plot of Dh versus concentrations of SDS-1.

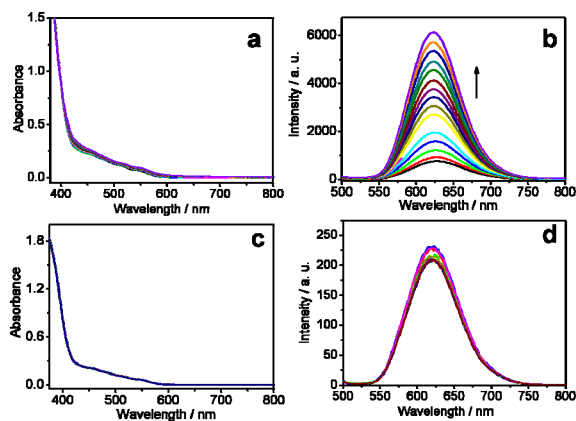


Fig. S5 Absorption (a) and emission (b) spectral changes of **1** (0.2 mmol/L) upon titration with SDBS (SDBS/**1** = 0, 0.2, 0.4, 0.6, 0.8, 1.0 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4, 2.6, 2.8, and 3.0). Absorption (c) and emission (d) spectral changes of **1** (0.2 mmol/L) upon titration with α -CD (α -CD/**1** = 0, 0.2, 0.4, 0.6, 0.8, 1.0 1.2, 1.4, and 1.6).

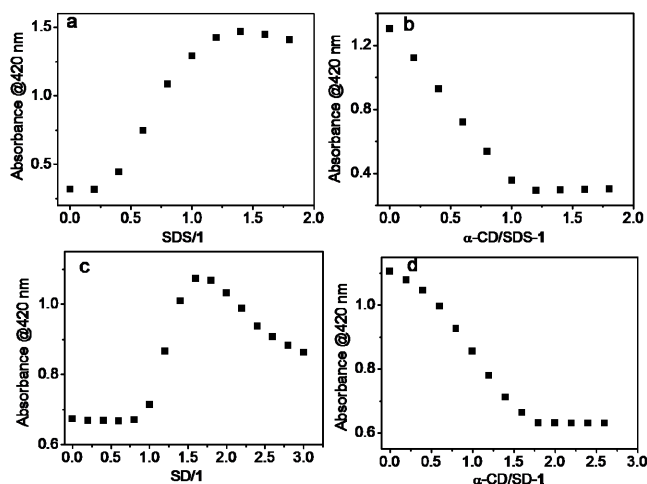


Fig. S6 (a) Absorbance changes of **1** at 420 nm (0.2 mmol/L) upon titration with SDS (SDS/**1** = 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6 and 1.8). (b) Absorbance changes of SDS-**1** at 420 nm (0.2 mmol/L) upon titration with α -CD (α -CD/SDS-**1** = 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6 and 1.8). (c) Absorbance changes of **1** at 420 nm (0.4 mmol/L) upon titration with SD (SD/**1** = 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4, 2.6, 2.8 and 3.0). (d) Absorbance changes of SD-**1** at 420 nm (0.4 mmol/L) upon titration with α -CD (SD/**1** = 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4 and 2.6).

Additional discussion

We measured quantum yields under the varied conditions. The change trend of the quantum yields was basically consistent with the corresponding absorption and emission spectra. Upon dropwise addition of SDS to an aqueous solution of **1** (0.2 mmol/L), the quantum yield stepwise increased at an SDS/**1** molar ratio of $> 0.2:1$, which reached a maximum of $\Phi = 0.025$ at an SDS/**1** molar ratio of 0.6 (Fig. S2a). Upon dropwise addition of α -CD to an aqueous solution of SDS-**1**, the quantum yield stepwise decreased at an α -CD/SDS-**1** molar ratio of $> 0.4:1$, which reached a minimum of $\Phi = 0.002$ at an α -CD/SDS-**1** molar ratio of 1.2 (Fig. S2b). Similarly, upon dropwise addition of SD to an aqueous solution of **1** (0.4 mmol/L), the quantum yield stepwise increased at an SD/**1** molar ratio of $> 1.2:1$, which reached a maximum of $\Phi = 0.013$ at an SD/**1** molar ratio of 2.2 (Fig. S2c). The quantum yield gradually decreased with dropwise adding α -CD, which reached a minimum of $\Phi = 0.002$ at an α -CD/SD-**1** molar ratio of 1.2 (Fig. S2d).

The absorbance values of the solutions for each emission experiment at the excitation wavelength (420 nm) were relatively large as shown in Fig. S6. In this sense, the self-absorption could occur in the present case, which however had negative contributions to the present luminescence enhancements. Although this negative effect appeared, the significant behaviors of reversible luminescence switching were demonstrated. Of note was that the self-assembly process was concentration dependent. The luminescence enhancement and supramolecular aggregation would not occur if we tried to weaken the self-absorption by reducing the concentration of **1** below critical aggregation concentrations (CACs) of SDS-**1** and SD-**1**.