Supplementary Material (ESI) for New Journal of Chemistry

Electronic Supplementary Information (ESI) for:

Fluorescence Modulation of a Pyrazolones Dye in the Solid State Based on Energy Transfer

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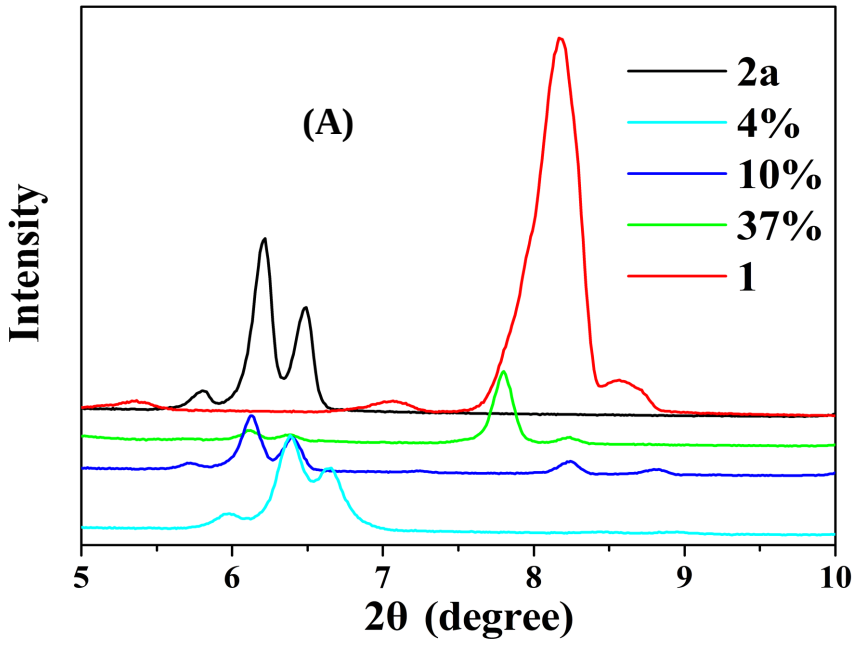
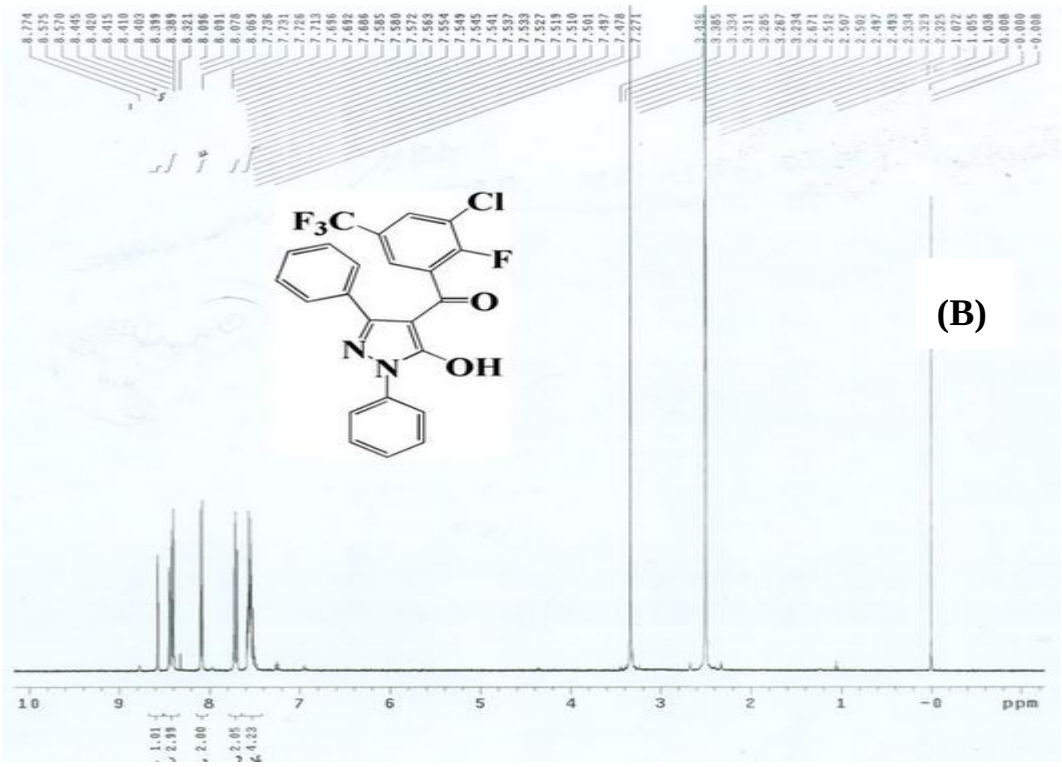
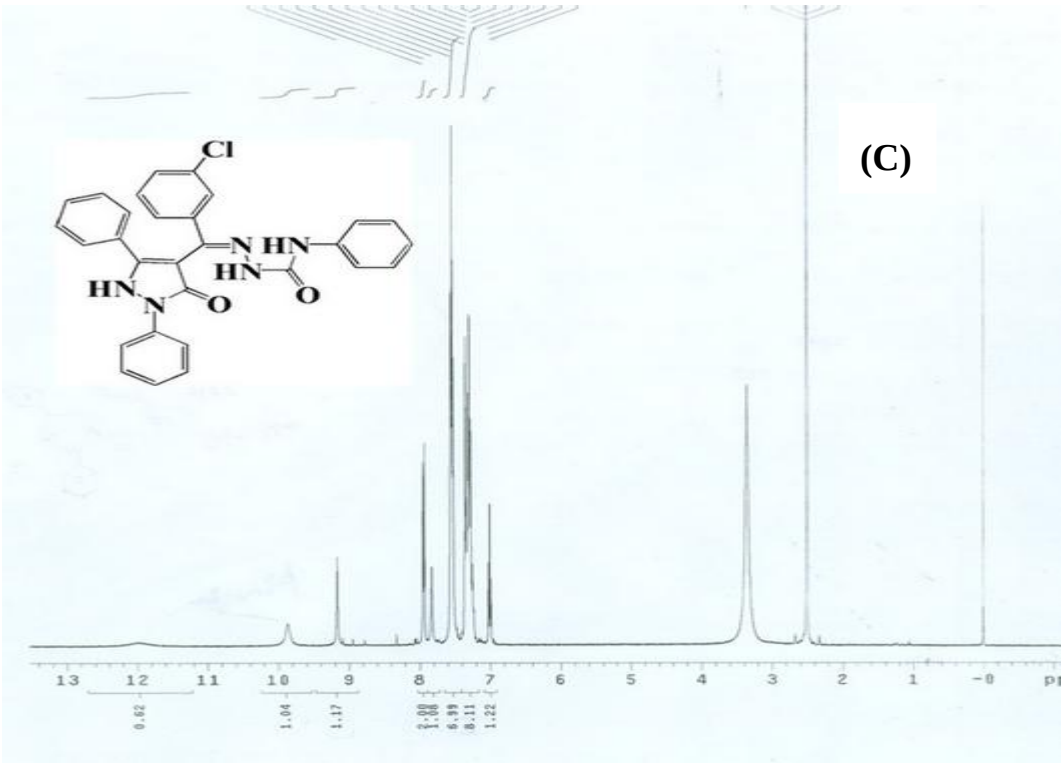
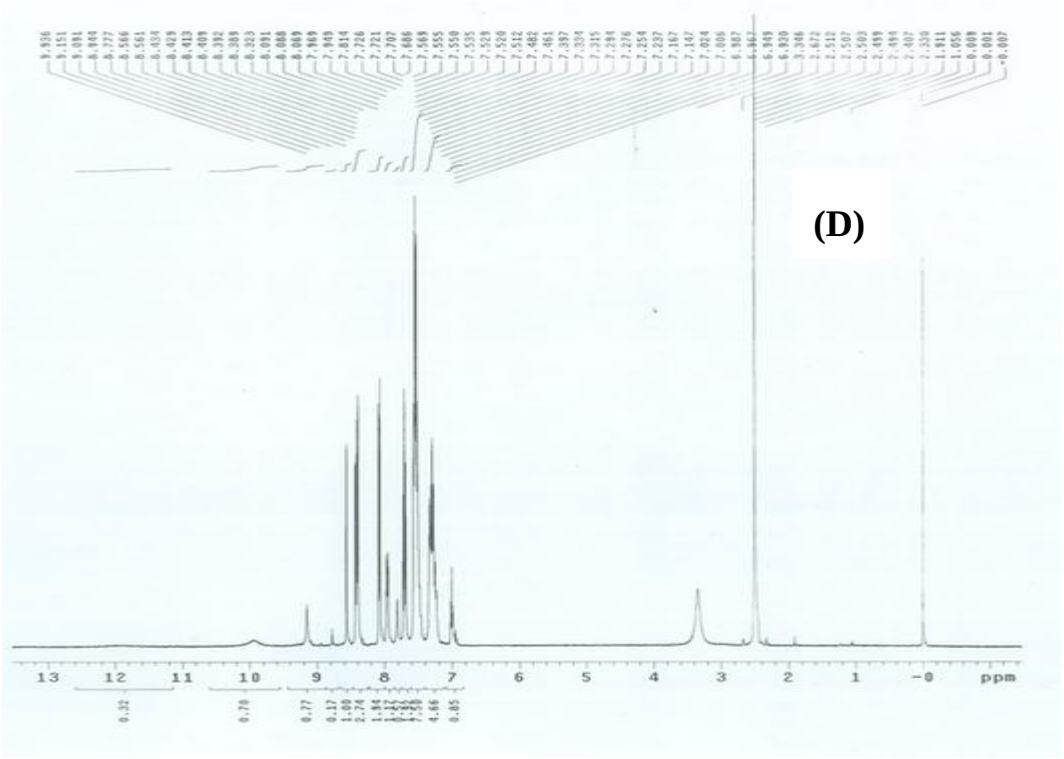
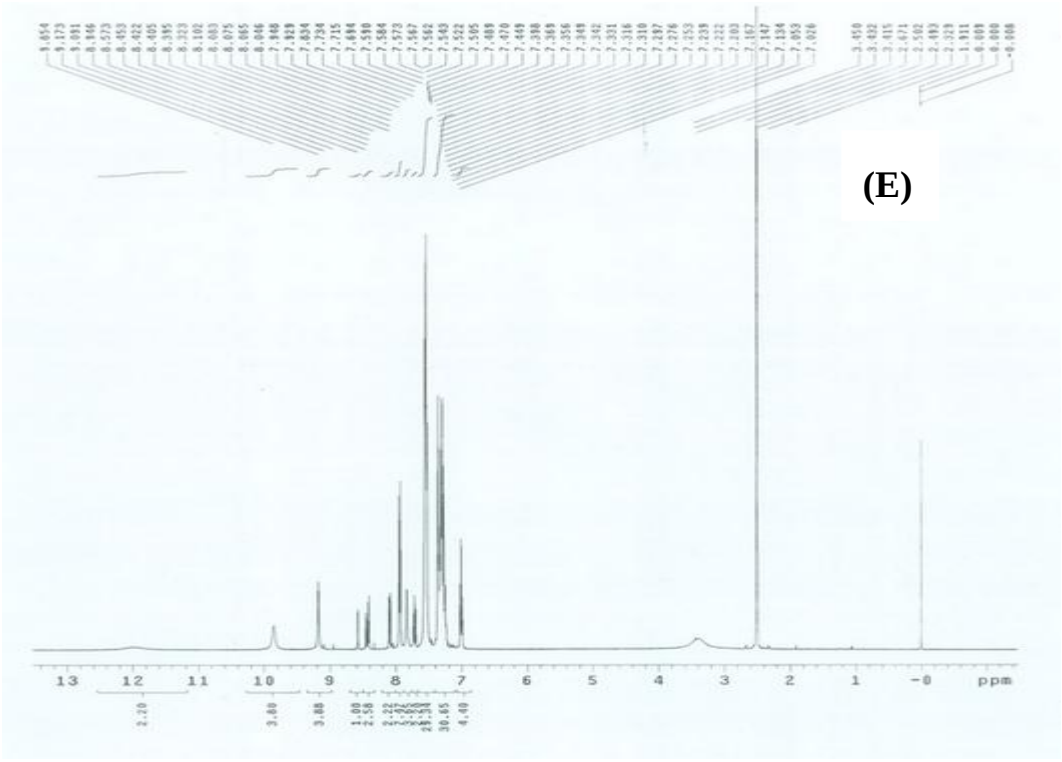
1. The XRD and ^{1}H NMR spectra of the compound **1**, **2a** and **FPM**











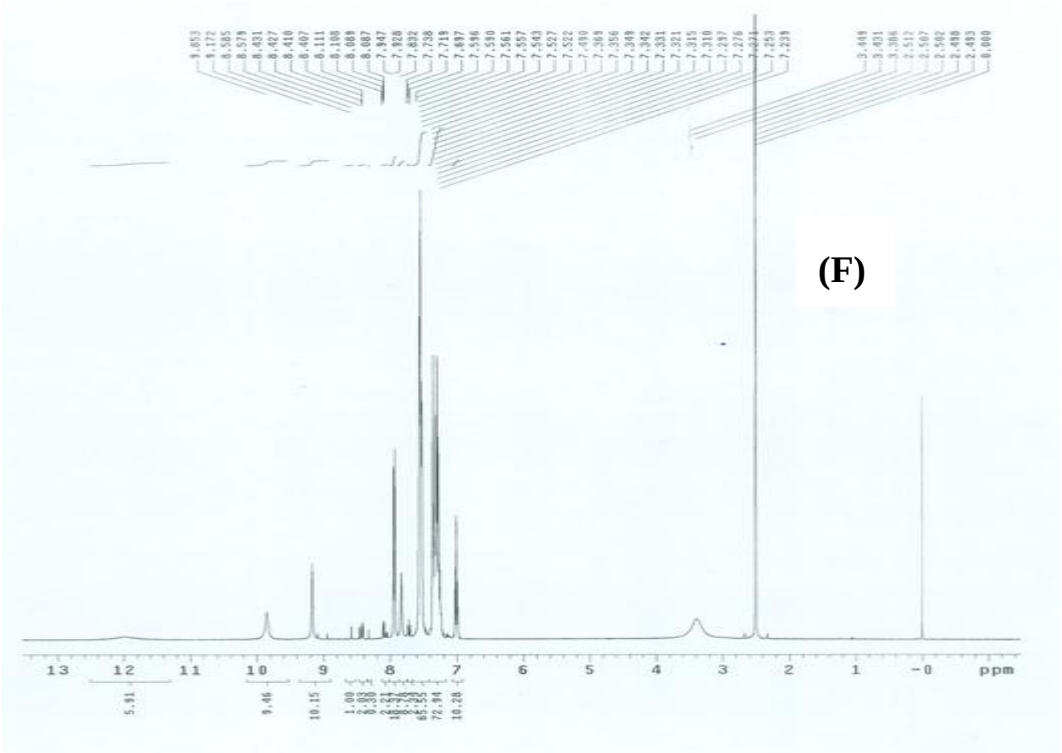


Fig. S1. (A) XRD spectra of pure **2a**, **FPM** (the concentration of **1**: 4 wt%, 10 wt%, 37 wt%) and pure **1**, respectively. (B), (C), (D), (E) and (F) ^{1}H NMR spectra of the compound **1**, **2a**, and **FPM** (the concentration of **1**: 37 wt%, 10 wt% and 4 wt%), respectively.

The XRD spectroscopy is a useful tool to confirm that the FPM is composed of **1** and **2a**. As shown in Fig.1A, the strong characteristic diffraction peaks of **2a** can be observed at 6.2 and 6.5, and the characteristic diffraction peaks of **1** can be observed at 8.1. Obviously, the characteristic diffraction peaks of **2a** was also observed in the FPM, the result confirms that **2a** is one of components of the FPM. When increasing the concentration of **1** in the FPM, an increasing intensity diffraction peak of **1** can be observed at 8.1, which distinctly demonstrates that **1** is one of components of the FPM. So the FPM is composed of **1** and **2a**.

The ^{1}H NMR spectra is another useful tool to confirm that FPM is composed of **1** and **2a**. As shown in Figure S1B-F, the strong characteristic peaks of **2a** and **1** can be observed at 9.13 ppm(1H, N4–H) and 8.6 ppm (two hydrogen feature shifts of the benzene-ring on the fourth position of pyrazolone-ring), respectively. Obviously, the integrated peak area of **2a** and **1** were easily obtained from Figure S1 (D, E, F), the concentration of **1** was 37 wt%, 10 wt% and 4 wt% by calculating in the FPM, respectively.

2. Comparison of **FPM** obtained by synthesis process and simple drying of the mixture solution of compounds **1** and **2a**.

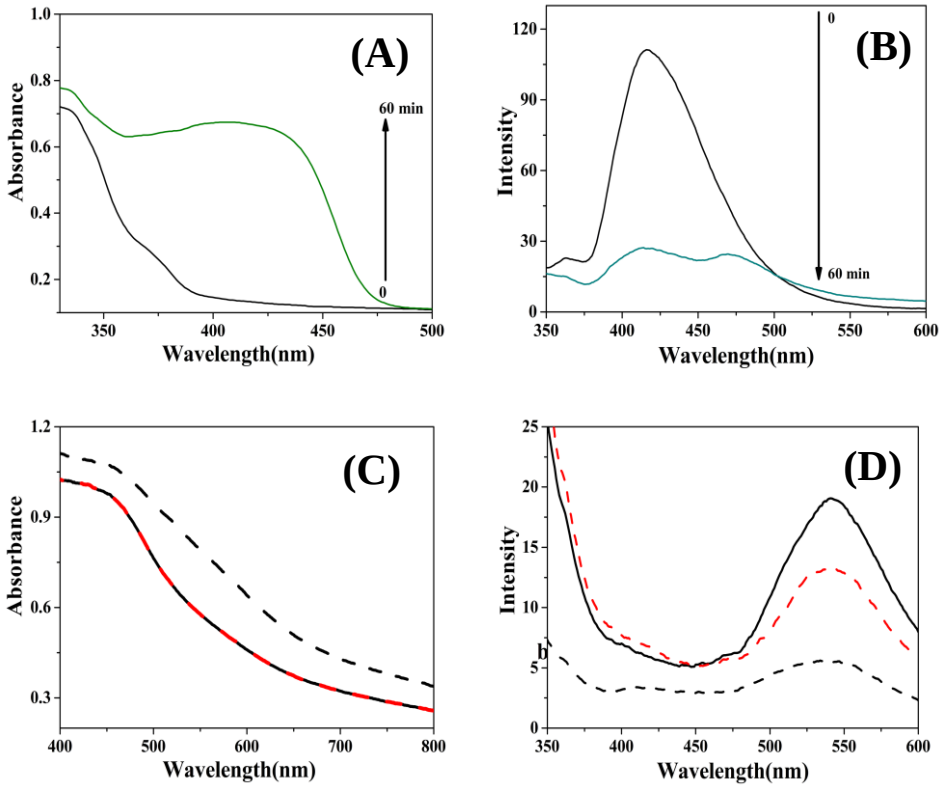


Fig. S2. (A) Absorption spectra changes of **FPM** (the concentration of **1**: 10 wt%), before (black line) and after (green line) 365 nm light irradiation for 60 minutes at room temperature in the solid state. (B) Fluorescence emission spectra of FPM (the concentration of **1**: 10 wt%) under 365 nm light irradiation for 60 minutes at room temperature in the solid state (λ_{ex} = 330 nm). (C) Absorption spectra changes of the simple drying of the mixture solution of compounds **1** and **2a** (the concentration of **1**: 10 wt%), before (black line) and after (red dash line) 365 nm light irradiation for 60 minutes, after heating at 120 ^{o}C for ten minutes (black dash line) in the solid state. (D) Fluorescence emission spectra of the simple drying of the mixture solution of compound **1** and **2a** (the concentration of **1**: 10 wt%), before (black line) and after (red dash line) 365 nm light irradiation for 60 minutes, after heating at 120 ^{o}C for ten minutes (black dash dash line) in the solid state (λ_{ex} = 330 nm).

3. The FT-IR spectra of the compound **2a** and FPM

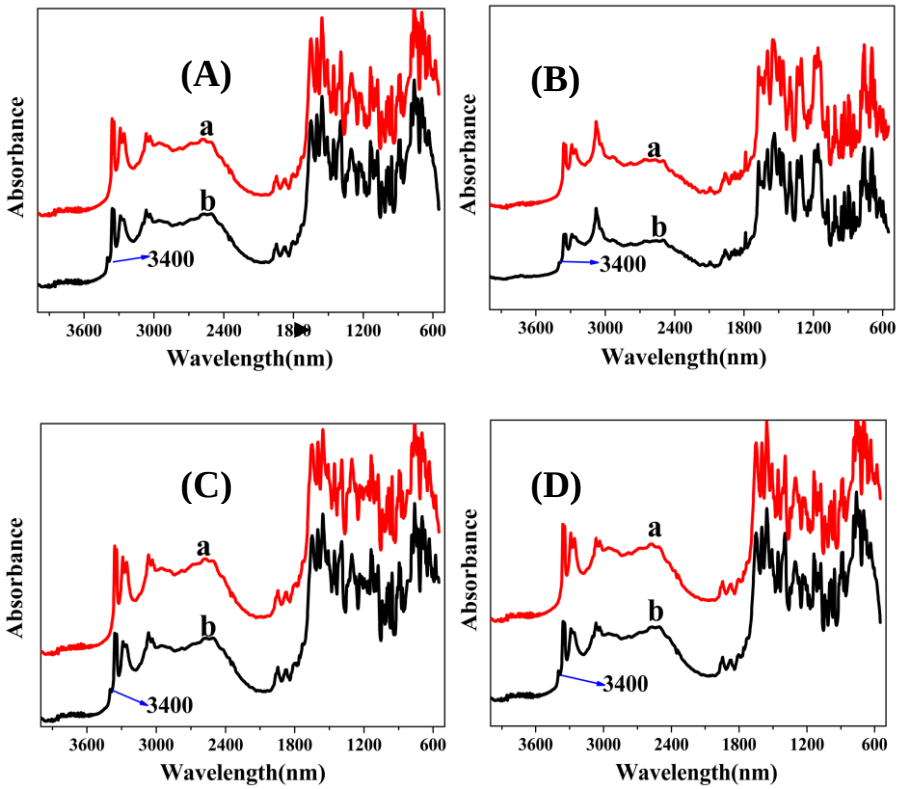


Fig. S3. (A) FT-IR spectra of **2a** (curve a), **2b** (curve b); (B), (C), (D) FT-IR spectra of **FPM** (the concentration of **1**: 37 wt%, 10 wt% and 4 wt%), respectively. and before (curve a) and after (curve b) 365 nm light irradiation for 60 minutes in the solid state.

4. Photochromism of FPM in the solid state by UV/heat.

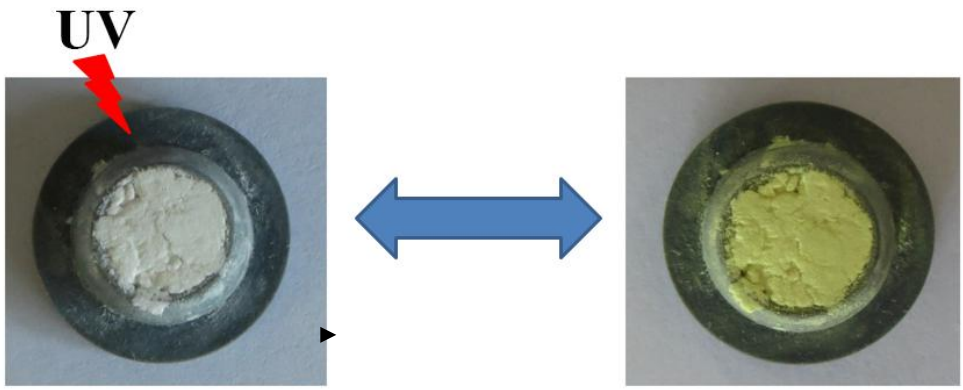


Fig. S4. The colour of FPM (the concentration of **1**: 10 wt%) reversibly changed from white to yellow.

5. The absorption spectra and fluorescence emission spectra of the FPM

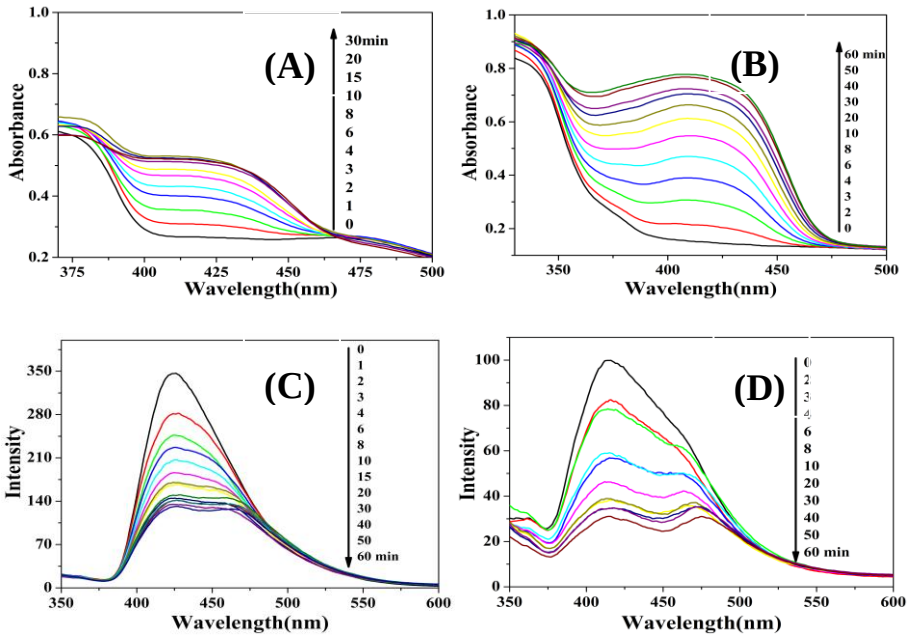


Fig. S5 (A) and (B) Absorption spectra changes of FPM (the concentration of **1**: 37 wt% and 4 wt%) under 365 nm light irradiation at room temperature in the solid state, respectively. (C) and (D) Fluorescence emission spectra of FPM (the concentration of **1**: 37 wt% and 4 wt%) under 365 nm light irradiation at room temperature in the solid state (λ_{ex} = 330 nm), respectively.