Electronic Supplementary Material (ESI)

Photo-driven Near-IR Fluorescence Switch: Synthesis and Spectroscopic Investigation of Squarine-Spiropyran Dyad

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Content:

1. Absorption spectra of **SP** (6) and Absorption and fluorescence emission spectra of corresponding **MC** form of **SP (6)** in ACN.

2. Absorption spectra of **SP** (6) and Absorption and fluorescence emission spectra of corresponding **MC** form of **SP (6)** in film.

3. Concentration dependent absorbance **SP-SQ-SP** (7) and **SQ** (3) in ACN solvent.

4. Absorption spectra of **SP-SQ-SP** (7) in ACN solution before and after UV irradiation at room temperature (300K).

5. Concentration dependent fluorescence **SP-SQ-SP** (7) and **SQ** (3) in ACN solvent.

6. Absorption and fluorescence emission spectra of **SQ** (3) in ACN.

7. Fluorescence spectra of **SP-SQ-SP** (7) nanoparticles in H₂O.

8. SEM micrograph and DSL size distribution of **SP-SQ-SP** (7) nanoparticles.

9. ¹H NMR spectra of **SQ** (3)

10. FT-IR Spectra of **SQ**(3)

11. ¹H NMR spectra of **SP-SQ-SP** (7)

12. ¹³C NMR spectra of **SP-SQ-SP** (7)

13. FT-IR spectra of **SP-SQ-SP** (7)

14. FT-IR spectra of **SP-COOH**

15. HRMS spectra of **SP-SQ-SP** (7)
Figure 1S. (a) Black colour curve, absorption spectra of SP(6) in ACN, (b) magenta colour curve, absorption spectra of SP after UV irradiation ($\lambda_{irr} = 330$ nm, 5 min) for 5 minutes, effectively shows the absorption spectra of MC form of SP(6) in ACN, (c) blue colour curve, fluorescence emission spectra of SP after UV irradiation ($\lambda_{irr} = 330$ nm) for 5 minutes in ACN, effectively shows the emission spectra of MC form of SP in ACN, Emission spectra was collected on excitation at 580 nm.
Figure 2S: (a) Black colour curve, absorption spectra of SP(6) in film, (b) magenta colour curve, absorption spectra of SP after UV irradiation ($\lambda_{\text{Irr}} = 330$ nm) for 10 seconds, effectively shows the absorption spectra of MC form of SP film, (c) blue colour curve, fluorescence emission spectra of SP after UV irradiation ($\lambda_{\text{Irr}} = 330$ nm) for 10 seconds in film, effectively shows the emission spectra of MC form of SP film, Emission spectra was collected on excitation at 600 nm.
Figure 3S: Concentration dependent absorbance SP-SQ-SP(7) and SQ(3) in ACN solvent.

Figure 4S: Absorption spectra of SP-SQ-SP (7) in ACN solution before and after UV irradiation at room temperature (300K).
Figure 5S: Concentration dependent fluorescence SP-SQ-SP (7) and SQ (3) in ACN solvent.

Figure 6SA: (a) Black colour curve, absorption spectra of SQ(3) in ACN. (b) Blue colour curve, fluorescence emission spectra of SQ(3) ($\lambda_{Ex}$ =600nm).
Figure 6SB: Relative fluorescence intensity of SQ and SP-SQ-SP when excited at 580 nm keeping nearly equal absorbance for both the compounds. Inset shows the absorption spectra of SQ and SP-SQ-SP of nearly equal absorbance.
Figure 7S: Fluorescence switching behaviour of SP-SQ-SP(7) nanoparticles dispersed in aqueous medium.
**Figure 8SA:** SEM image of as prepared nanoparticles of SP-SQ-SP(7) shown in different magnifications (A) 5K, (B) 7K, (C) 10 K and (D) 15 K. Estimated size of the nanoparticles is <100 nm.

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**Result quality:** Refer to quality report

**Figure 8SB:** Size distribution of as prepared nanoparticles of SP-SQ-SP(7) dispersed in water observed in DLS.
Figure 9S: S1: $^1$H NMR spectra of SQ (3)

Figure 10S: FT-IR Spectra of SQ(3)
Figure 11S: $^1$H NMR spectra of SP-SQ-SP (7)

Figure 12S: $^{13}$C NMR spectra of SP-SQ-SP (7)
Figure 13S: FT-IR spectra of SP-SQ-SP (7)

Figure 14S: FT-IR spectra of SP-COOH
**Figure 15S:** HRMS spectra of SP-SQ-SP (7)