Ultra-Sensitive Detection of Explosive in Solution and Film as well as the Development of Thicker Film Effectiveness by Tetraphenylethene Moiety in AIE Active Fluorescent Conjugated Polymer

Khama Rani Ghosh, Sukanta Kumar Saha, Zhi Yuan Wang

a Department of chemistry, Carleton University, 1125 Colonel by Drive, Ottawa, K1S5B7, ON, Canada

b State Key Laboratory of Polymer Physics and Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, 130022, China

Fig. S1: Photographs of polymer P1 in H₂O/THF mixtures with different fractions of water (f_w) taken under UV illumination.
**Fig. S2:** Plot of (I/I₀) values versus the compositions of the aqueous mixtures. I₀ is the emission intensity in pure THF solution.

**Fig S3.** Stern-Volmer plots of polymer P1 corresponding to PA. I₀ is the emission intensity in H₂O/THF mixture containing 90% of water.
Fig S4. Cyclic voltammograms of the polymer films (P1) on Pt electrode in 0.1 mol/L Bu₄CF₆, CH₃CN solution with a scan rate of 100 mV/s.

Fig S5. Normalized absorption of DNT, PA and normalized PL of polymer P1
Fig S6. Fluorescence quenching response of polymer P1 in 90% H₂O/THF mixture with respect to PA at different concentration

Fig S7. Time-dependent PL spectra of the spin-coating film of P1 upon exposure to DNT vapor at room temperature for 0 to 360 seconds. Film thickness: 4 nm; Excitation wavelength: 375 nm
**Fig S8.** Time-dependent PL spectra of the spin-coating film of **P1** upon exposure to DNT vapor at room temperature for 0 to 360 seconds. Film thickness: 22 nm; Excitation wavelength: 375 nm.

**Fig S9.** Time-dependent PL spectra of the spin-coating film of **P1** upon exposure to DNT vapor at room temperature for 0 to 360 seconds. Film thickness: 75 nm; Excitation wavelength: 375 nm.