Electronic Supplementary Material (ESI) for Analytical Methods.

Anthracene labeled poly(pyridine methacrylamide) as polymer-based chemosensors for detection of pyrophosphate ($P_2O_7^{4-}$) in semi-aqueous media

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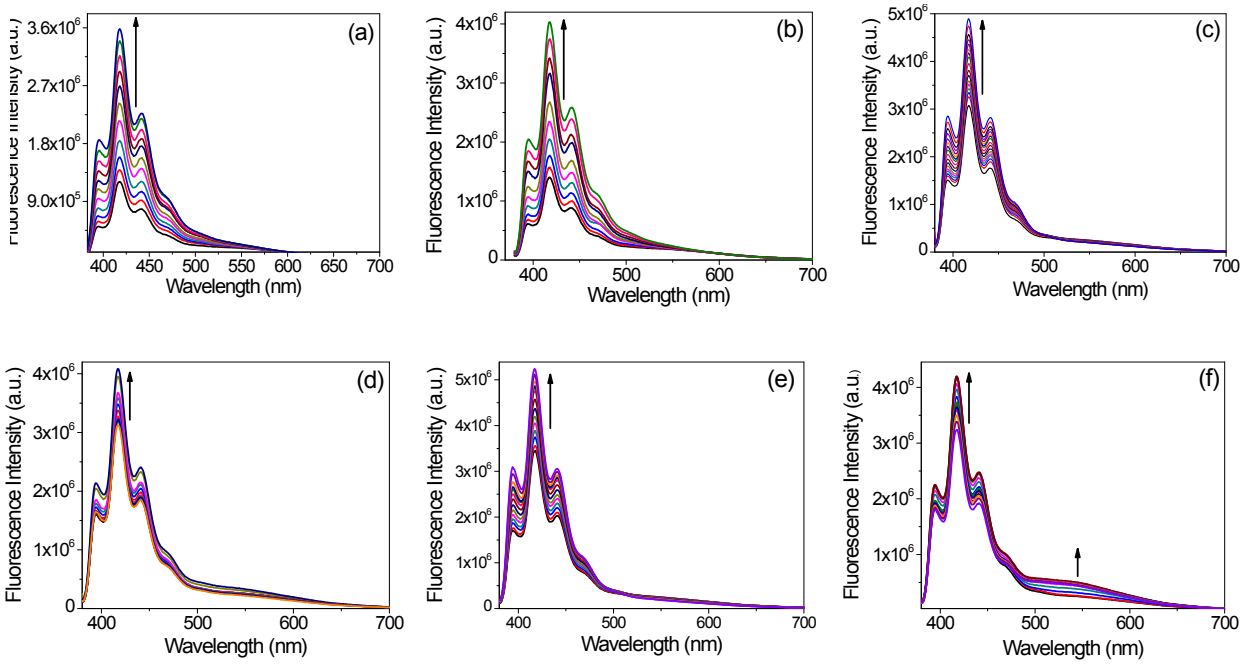
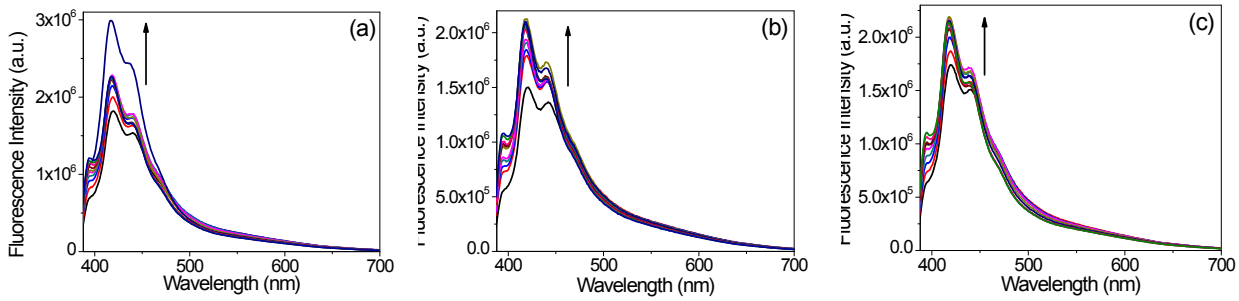


Fig. S1. Change in emission of **P1** (c = 0.06 mg/mL) upon successive addition of (a) acetate (OAc^-) (b) F^- (c) Cl^- (d) Br^- (e) I^- and (f) HSO_4^- (taken as tetrabutyl amonimum salt) (c = 1.0×10^{-3} M) from 0 to 0.4 mL in DMSO.



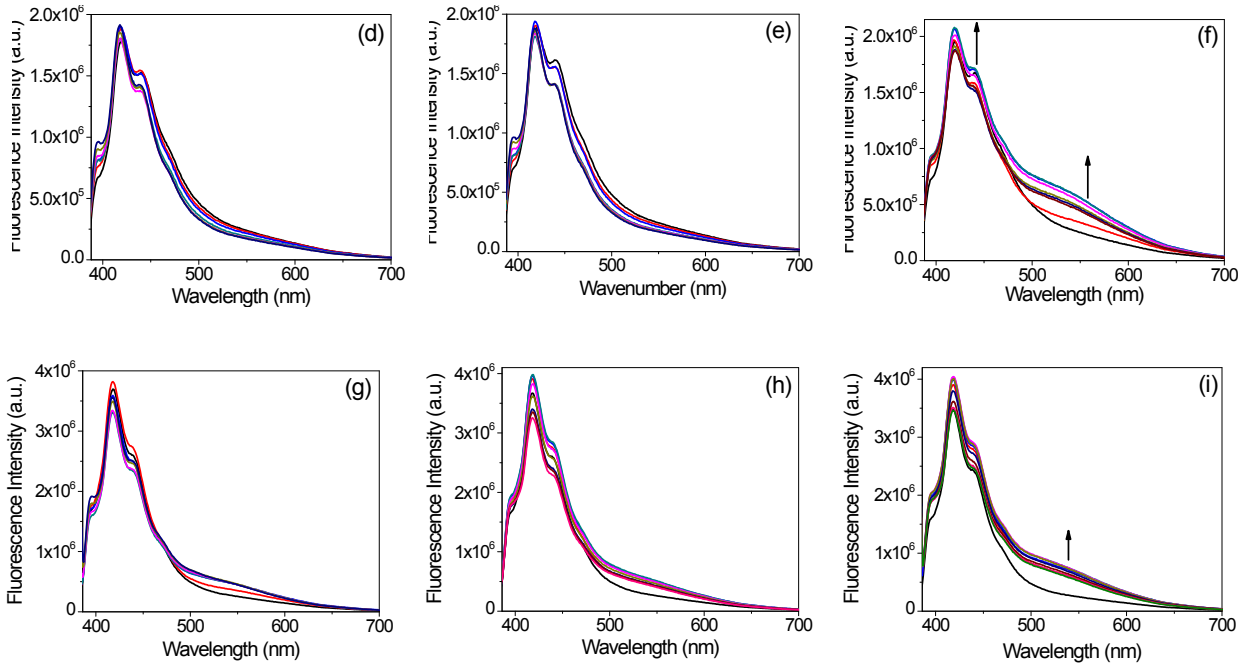


Fig. S2. Change in emission of **P1** (c = 0.06 mg/mL, λ_{ex} = 370 nm) upon successive addition of (a) acetate (OAc^-) (b) F^- (c) Cl^- (d) Br^- (e) I^-, (f) HSO_4^- (g) AMP, (h) ADP and (i) ATP (taken as tetrabutyl amonimum salt) (c = 1.0×10^{-3} M) from 0 to 0.4 mL in DMSO-H_2O (3:1, v/v).

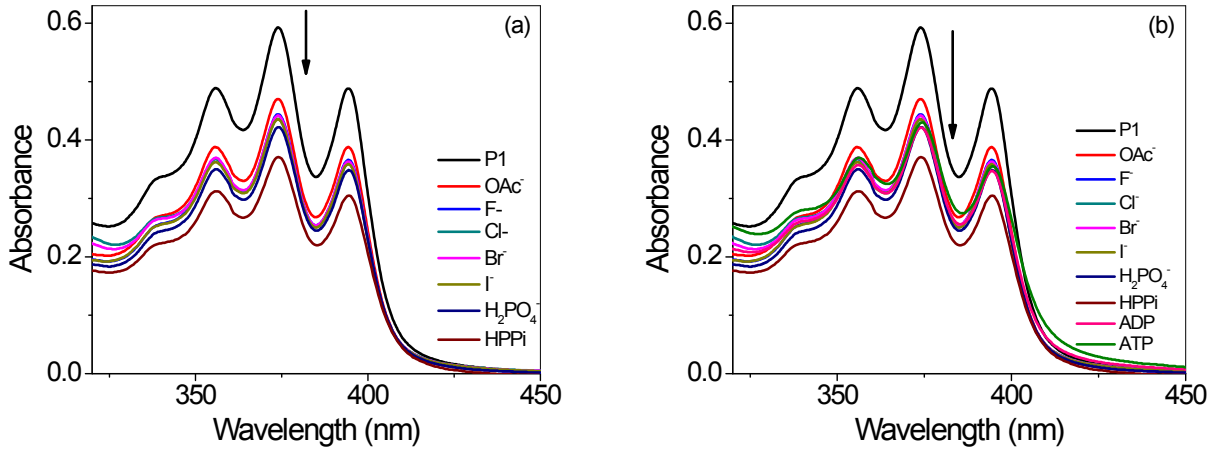


Fig. S3. Changes in absorption of **P1** (c = 0.06 mg/mL) upon addition of 0.4 mL solution of various anions (a) (OAc^-, F^-, Cl^-, Br^-, I^-, $H_2PO_4^-$, HPPi as Bu_4N salt) in DMSO and (b) (OAc^-, F^-, Cl^-, Br^-, I^-, $H_2PO_4^-$, HPPi, ADP and ATP in DMSO-H_2O (c = 1×10^{-3} M).

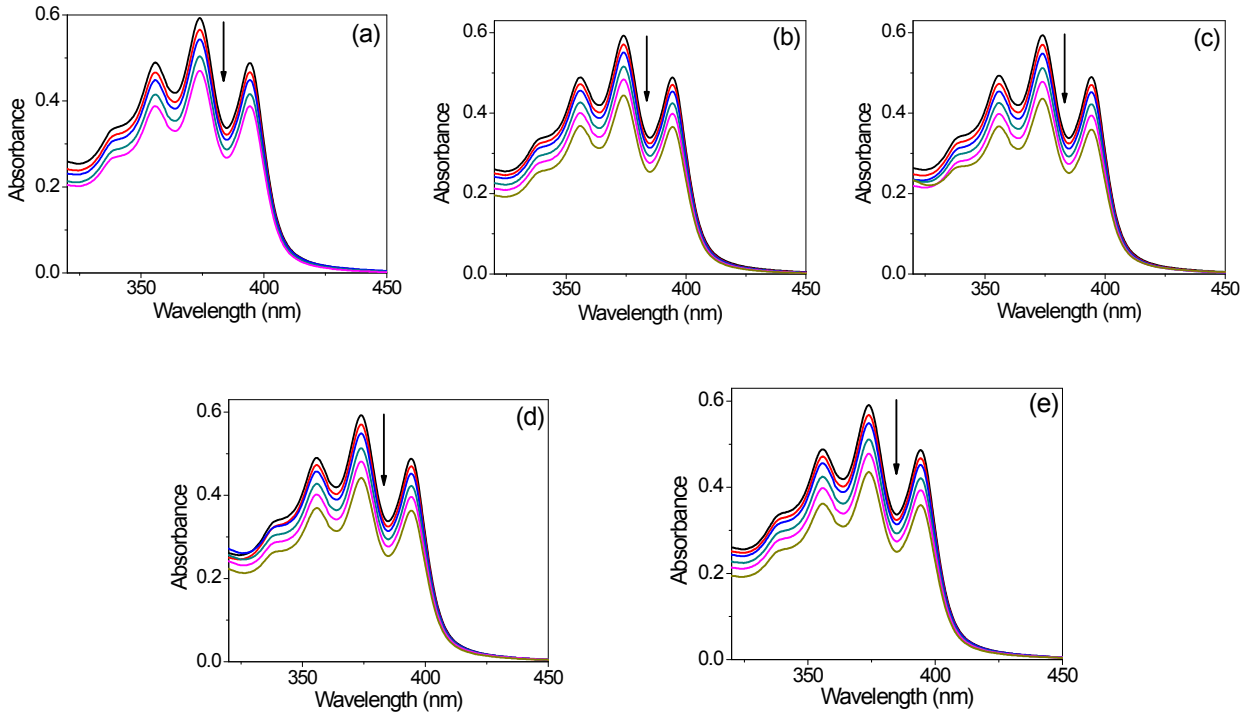
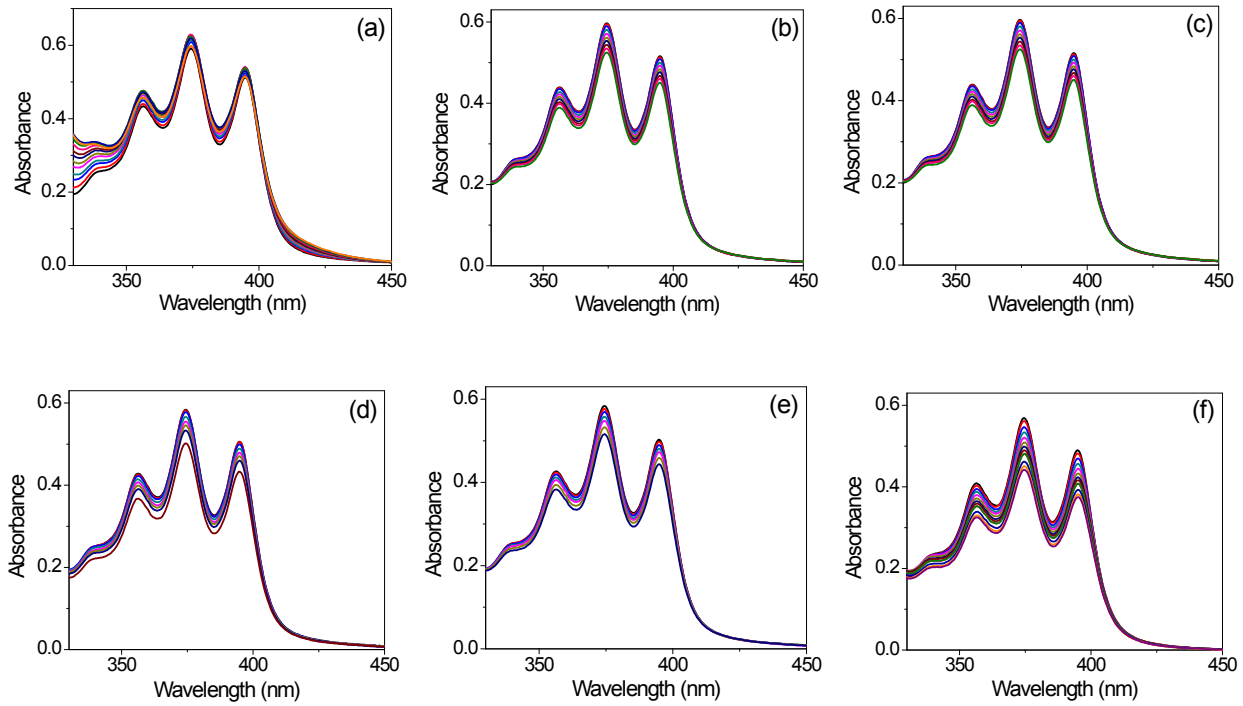


Fig. S4. Changes in absorption of **P1 (**c = 0.06 mg/mL) upon the successive addition of solution of various anions (OAc^-, F^-, Cl^-, Br^- and I^- from 0 mL to 0.4 mL in DMSO (c = 1×10^{-3} M).



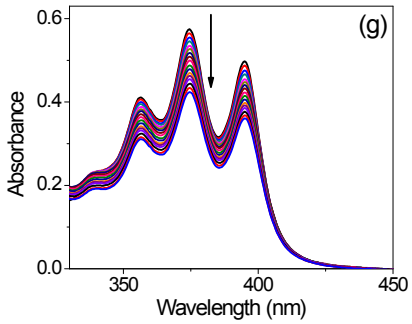


Fig. S5. Changes in absorption of **P1** (c = 0.06 mg/mL) upon the successive addition of solution of various anions (OAc^{-}, F^{-}, Cl^{-}, Br^{-}, I^{-}, ADP and ATP from 0 mL to 0.4 mL in DMSO-H_2O (c = 1×10^{-3} M).

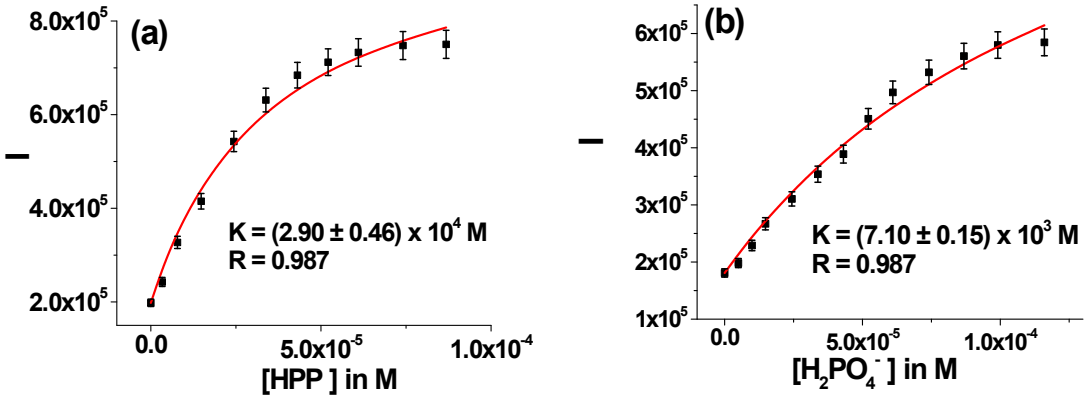


Fig. S6. Binding constant curves for **P1** with (a) hydrogen pyrophosphate and (b) dihydrogen phosphate from non-linear fitting of fluorescence titration data in DMSO at 520 nm.

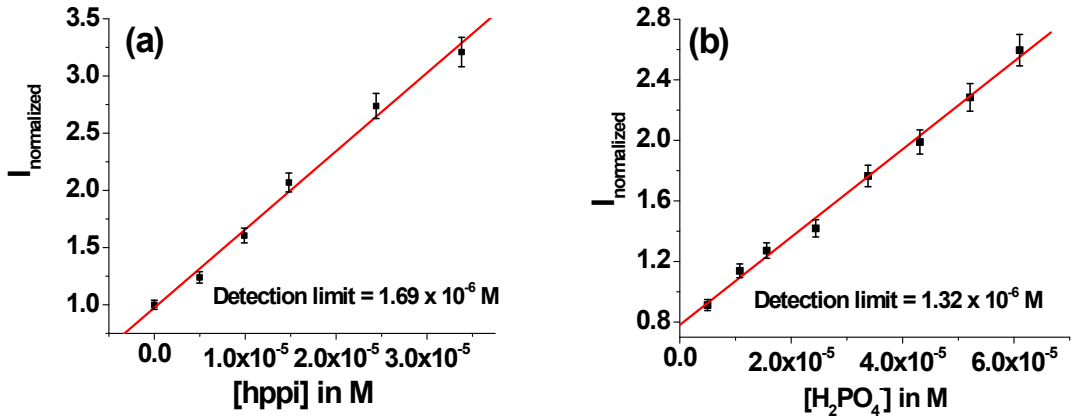


Fig. S7. Detection limits for polymer **P1** (*c* = 0.06 mg/mL) with (a) HPPi and (b) $H_2PO_4^-$ (*c* = 1.0×10^{-3} M) ions in DMSO.

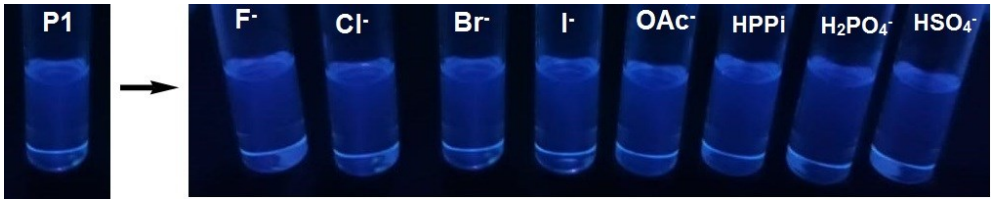


Fig. S8. Photograph showing solution of **P1** in absence and presence of 0.4 mL solution of various anions (c = 1.0 × 10^{-3} M) as tetrabutylammonium salts in DMSO-H_2O (3:1, v/v), ([**P1**] = 0.06 mg/mL) under hand held UV light.

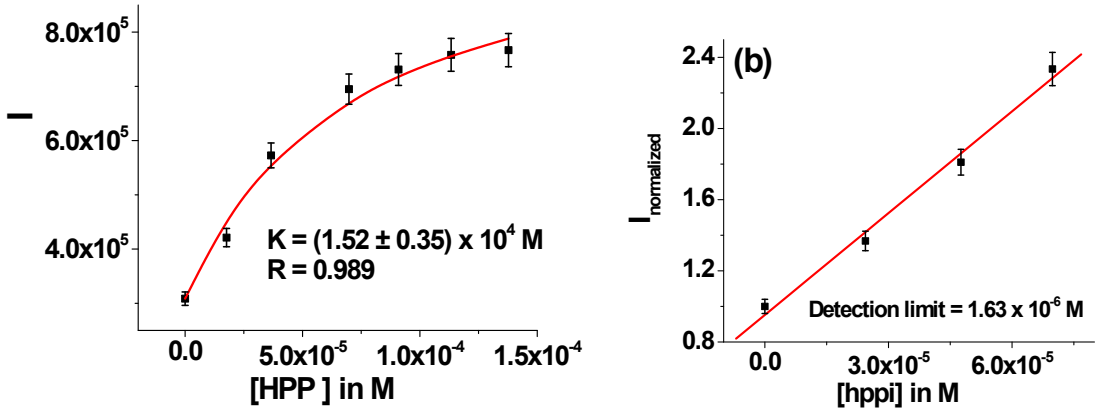


Fig. S9. (a) Binding constant curve for **P1** with hydrogen pyrophosphate from non-linear fitting of fluorescence titration data in DMSO-H_2O (3:1, v/v) at 530 nm and (b) detection limit for **P1** (c = 0.06 mg/mL) with HPPi (c = 1.0 × 10^{-3} M) in DMSO-H_2O (3:1, v/v).

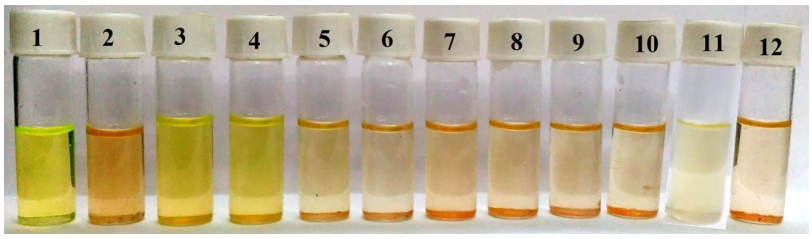


Fig. S10. Photograph showing (1) Uranine dye, (2) dye + 0.3 mL polymer solution (1 mg/mL), ensemble with (3) PPi, (4) HPPi, (5) $H_2PO_4^-$, (6) OAc^-, (7) F^-, (8) Cl^-, (9) Br^-, (10) I^-, (11) HSO_4^- and (12) NO_3^- in DMSO/H_2O (1:1 v/v, pH = 6.8, 10 mM Tris HCl buffer) [anions were taken as tetrabutylammonium salt and pyrophosphate as sodium salt].

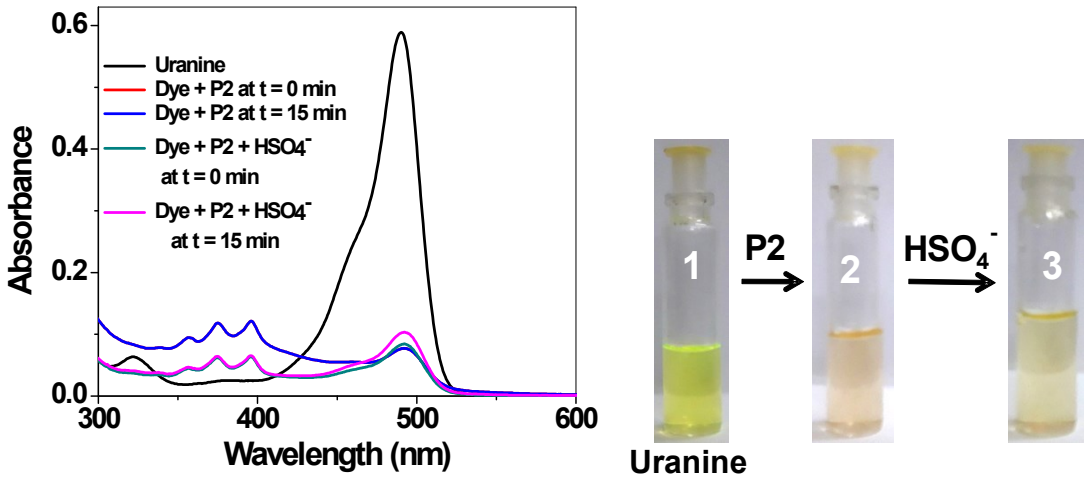


Fig. S11. Change in absorbance of uranine dye upon addition of 0.3 mL of **P2** solution and absorbance of **P2**-dye ensemble after addition 0.6 ml amounts of HSO_4^- (c = 5 ×10^{-3} M) to the ensemble in DMSO-H_2O (1:1 v/v, pH = 6.8, 10 mM TrisHCl buffer) ([dye] = 2.5 × 10^{-5} M, [polymer **P2**] = 0.06 mg/mL) (left); Photograph showing color of (1) Uranine dye, (2) dye + 0.3 mL of **P2** polymer ensemble and (3) ensemble treated with HSO_4^- [HSO_4^- taken as tetrabutylammonium salt] (right).

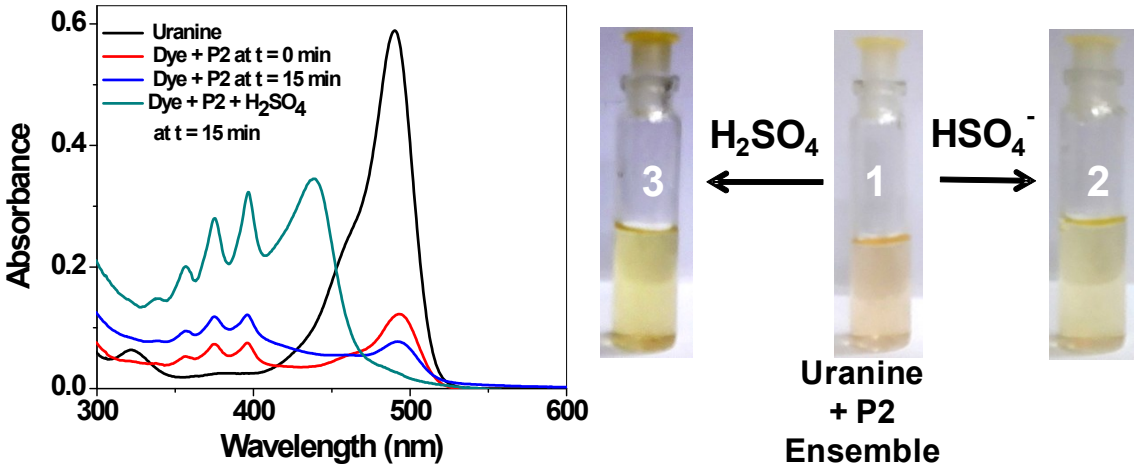


Fig. S12. Change in absorbance of uranine dye upon addition of 0.3 mL of **P2** solution and absorbance of **P2**-dye ensemble after addition 0.6 ml amounts of H_2SO_4 (c = 5 ×10^{-3} M) to the ensemble in DMSO-H_2O (1:1 v/v, pH = 6.8, 10 mM TrisHCl buffer) ([dye] = 2.5 × 10^{-5} M, [polymer **P2**] = 0.06 mg/mL) (left); Photograph showing color change (right).

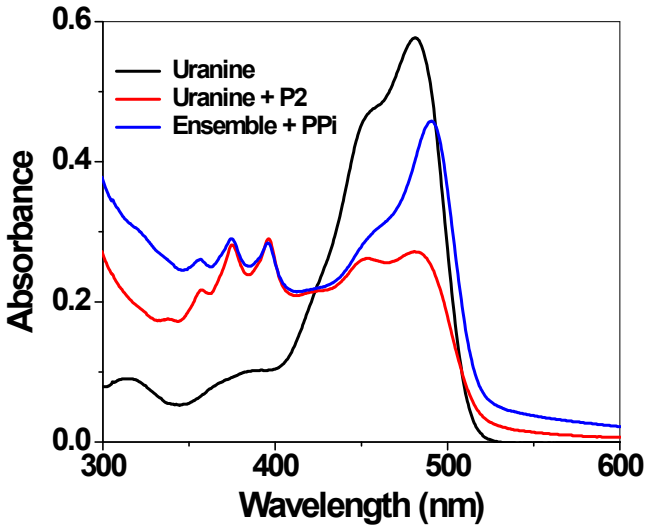


Fig. S13. Change in absorption intensity of Uranine dye upon addition of **P2** (0.3 mL) and dye-ensemble upon the addition of 0.6 mL of PPi (c = 5 $\times 10^{-3}$ M) in DMSO-H_2O (1:1 v/v, pH = 4.0, 10 mM TrisHCl buffer) ([dye] = 2.5 $\times$ 10^{-5} M, [polymer **P2**] = 0.06 mg/mL).

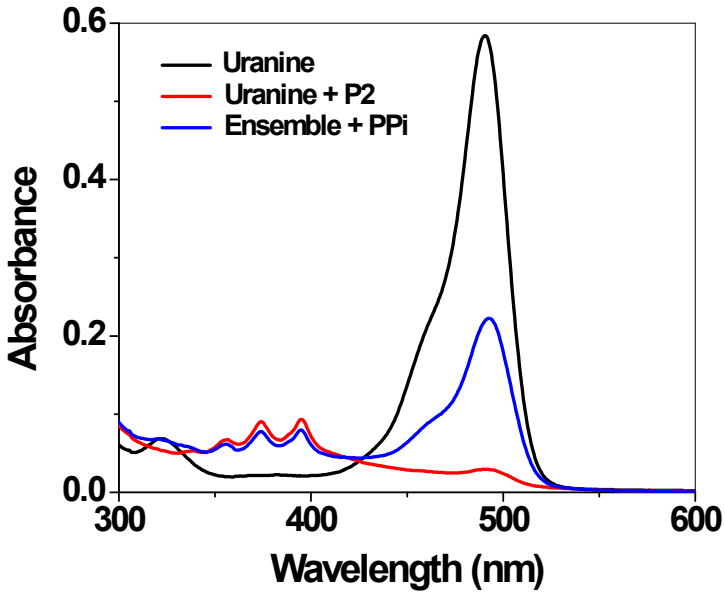


Fig. S14. Change in absorption intensity of Uranine dye upon addition of **P2** (0.3 mL) and dye-ensemble upon addition of 0.6 mL of PPi (c = 5 $\times 10^{-3}$ M) in DMSO-H_2O (1:1 v/v, pH = 10.0, 10 mM TrisHCl buffer) ([dye] = 2.5 $\times$ 10^{-5} M, [polymer **P2**] = 0.06 mg/mL).

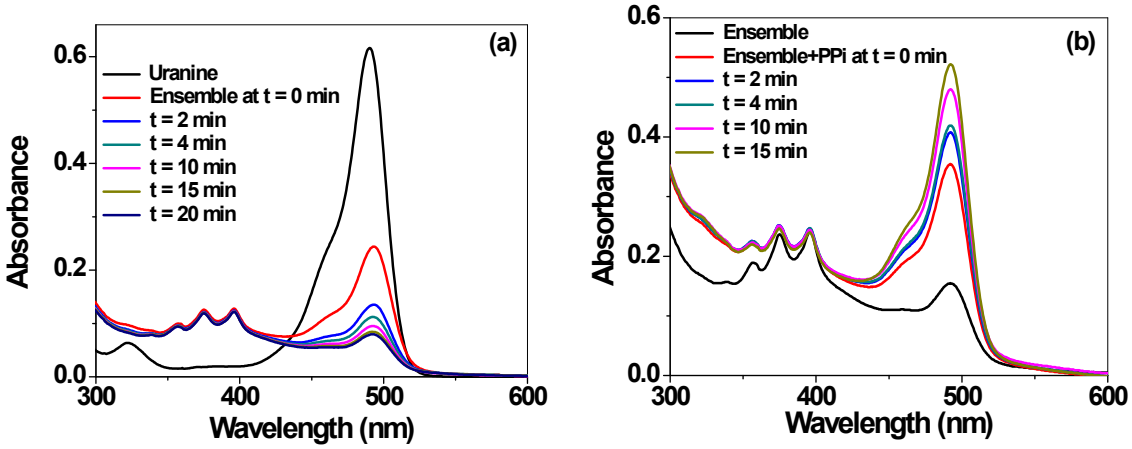


Fig. S15. Change in absorption intensity with time of (a) uranine dye upon addition of 0.3 mL of **P2** solution and (b) **P2**-dye ensemble after addition 0.6 ml amounts of PPi (c = 5 $\times 10^{-3}$ M) to the ensemble in DMSO-H_2O (1:1 v/v, pH = 6.8, 10 mM TrisHCl buffer) ([dye] = 2.5 $\times$ 10^{-5} M, [polymer **P2**] = 0.06 mg/mL).

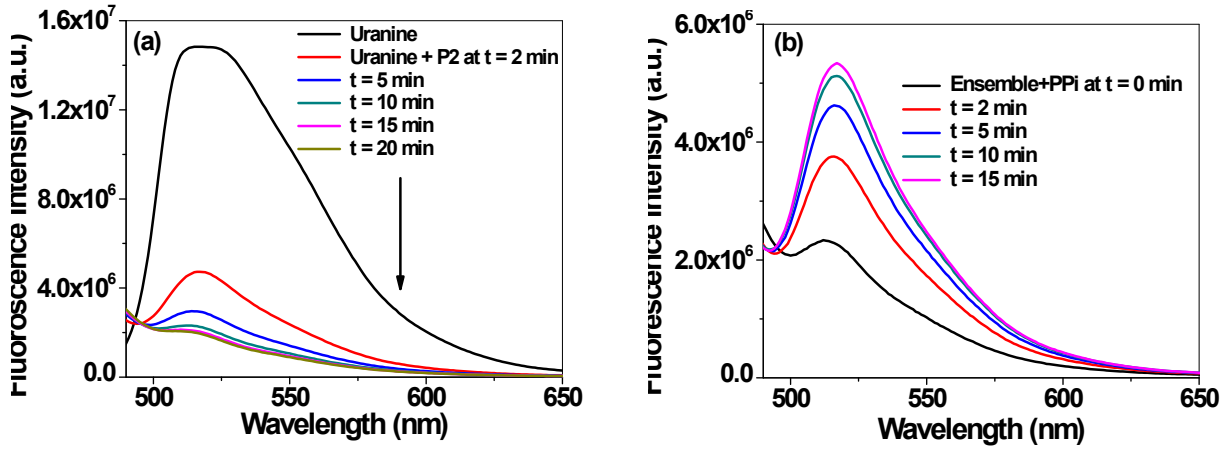
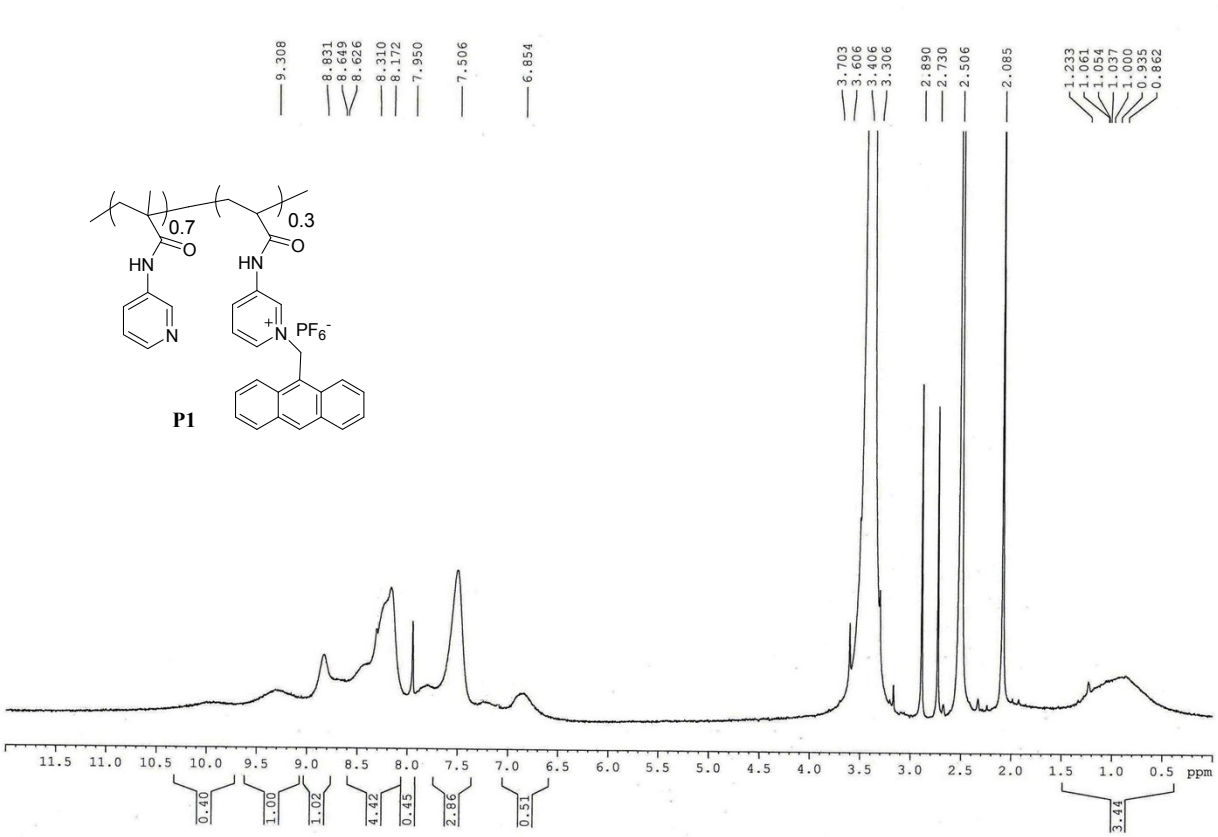
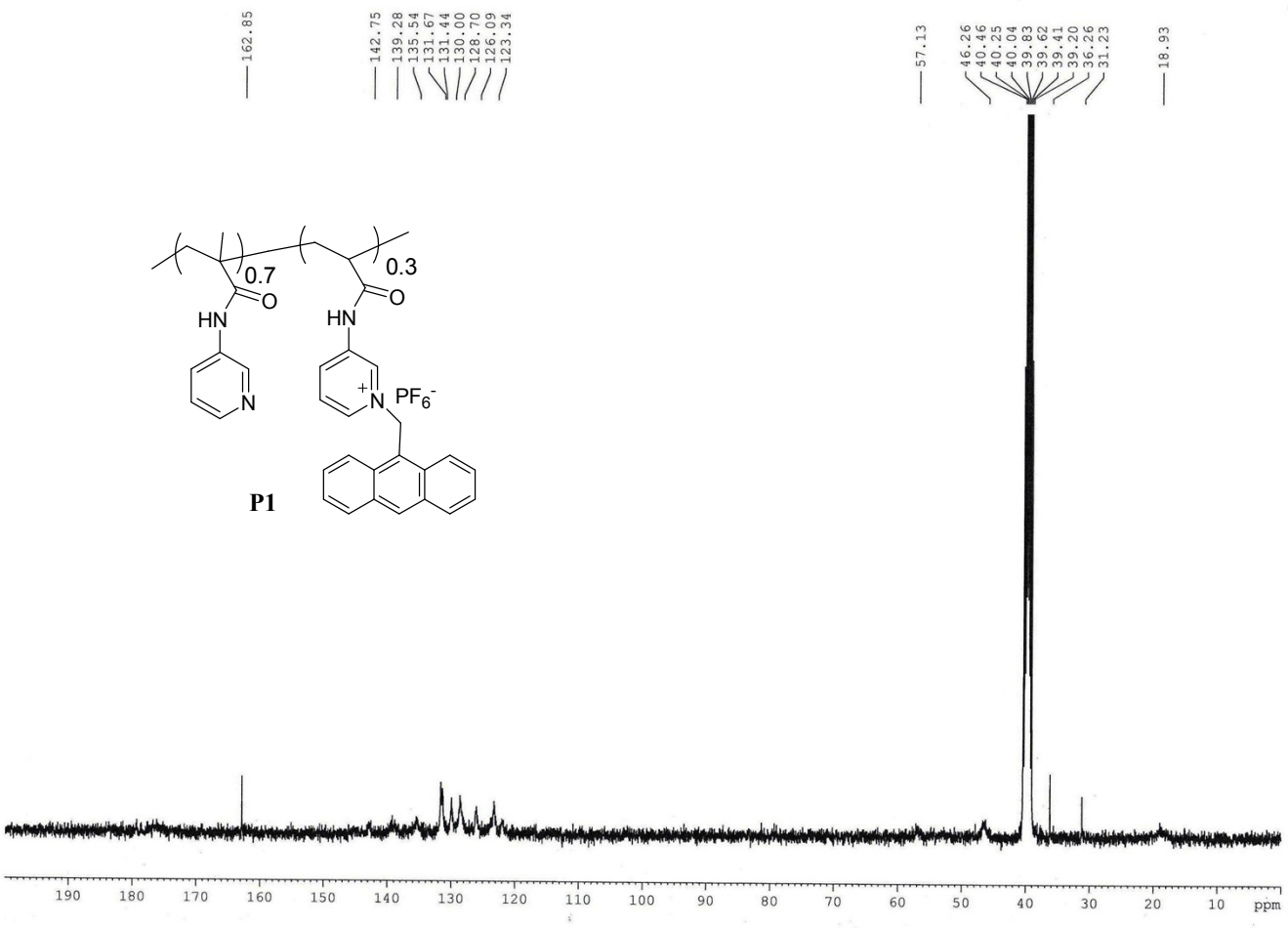


Fig. S16. (a) Decrease in fluorescence intensity of uranine dye upon addition of 0.3 mL of **P2** with time and (b) retrieval of fluorescence intensity of uranine dye with time upon addition of 0.6 mL of PPi (c = 5 $\times$ 10^{-3} M) to the **P2**-dye ensemble in DMSO-H_2O (1:1 v/v, pH = 6.8, 10 mM Tris HCl buffer).

^{1}H NMR of P1 in d_6-DMSO (400 MHz)

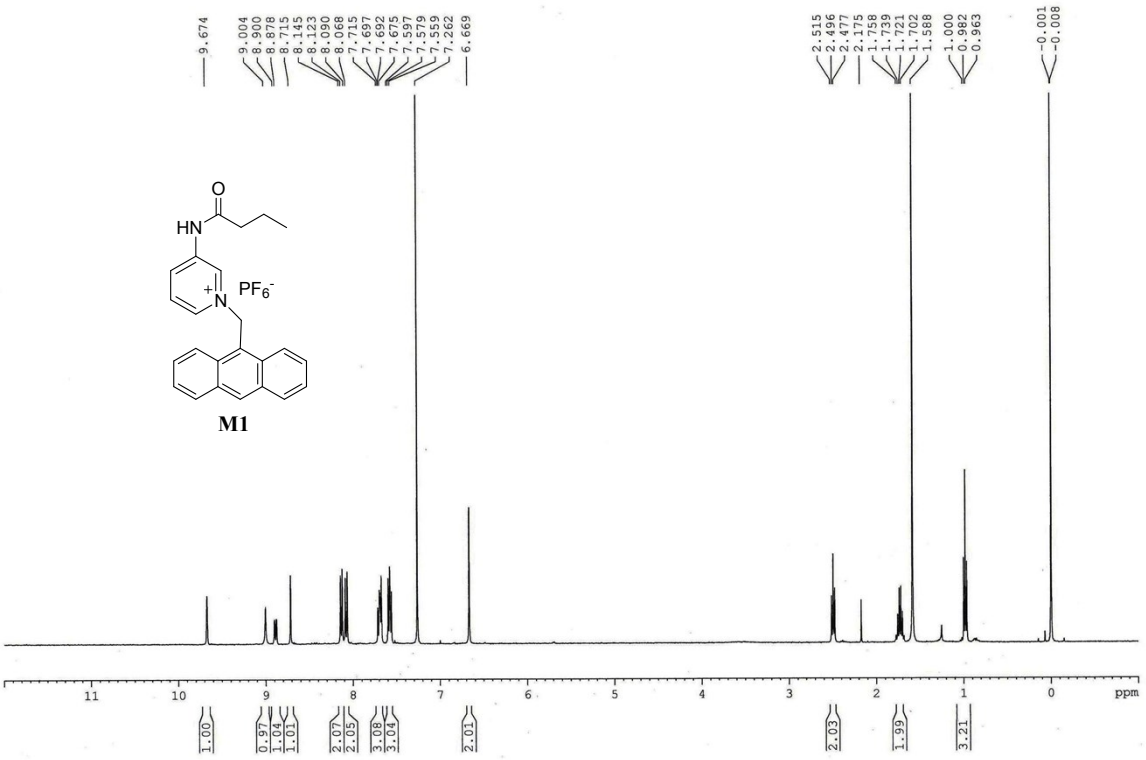


^{13}C NMR of P1 in d_6-DMSO (100 MHz)



P1

^{1}H NMR of M1 in $CDCl_3$ (400 MHz)



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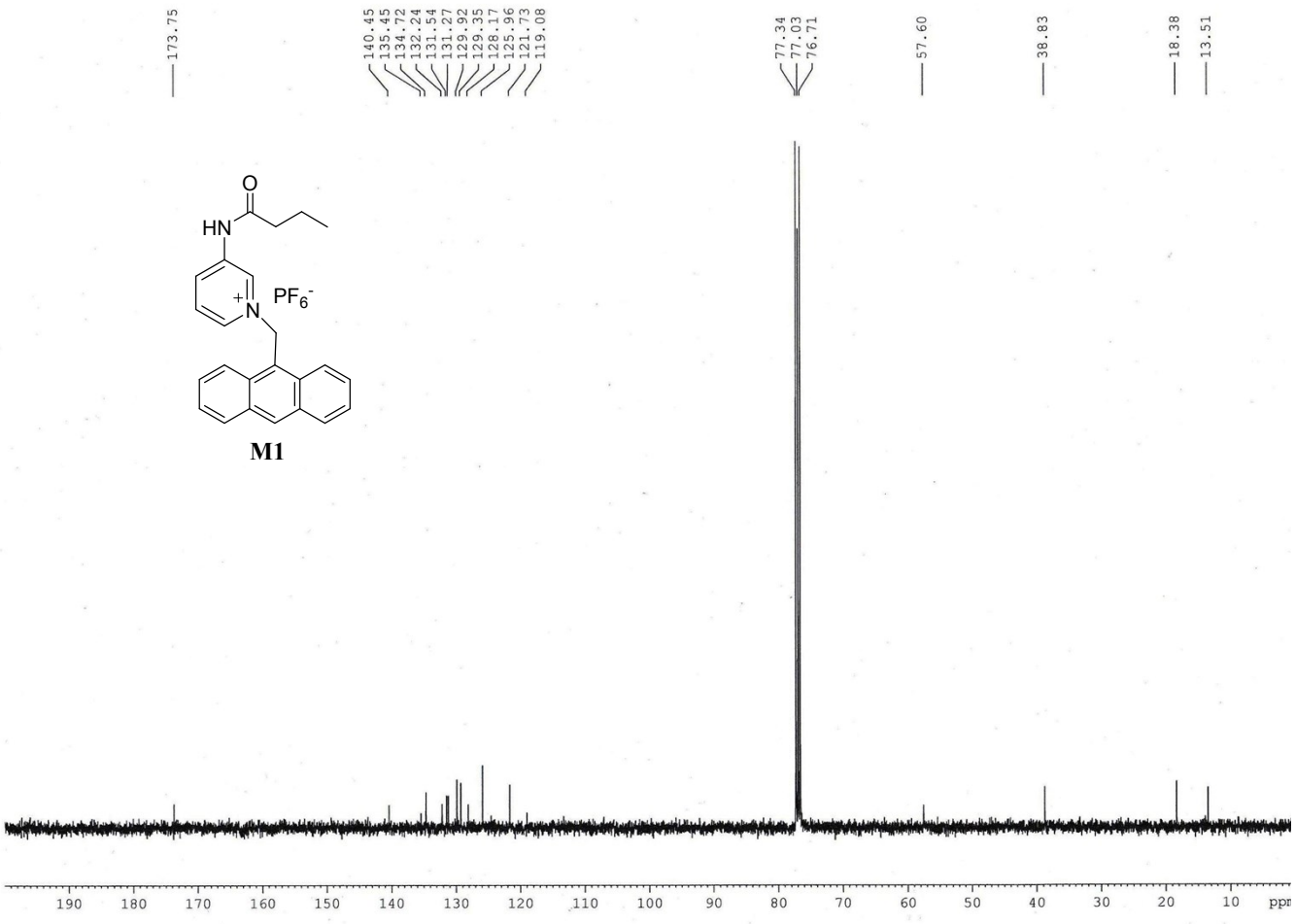
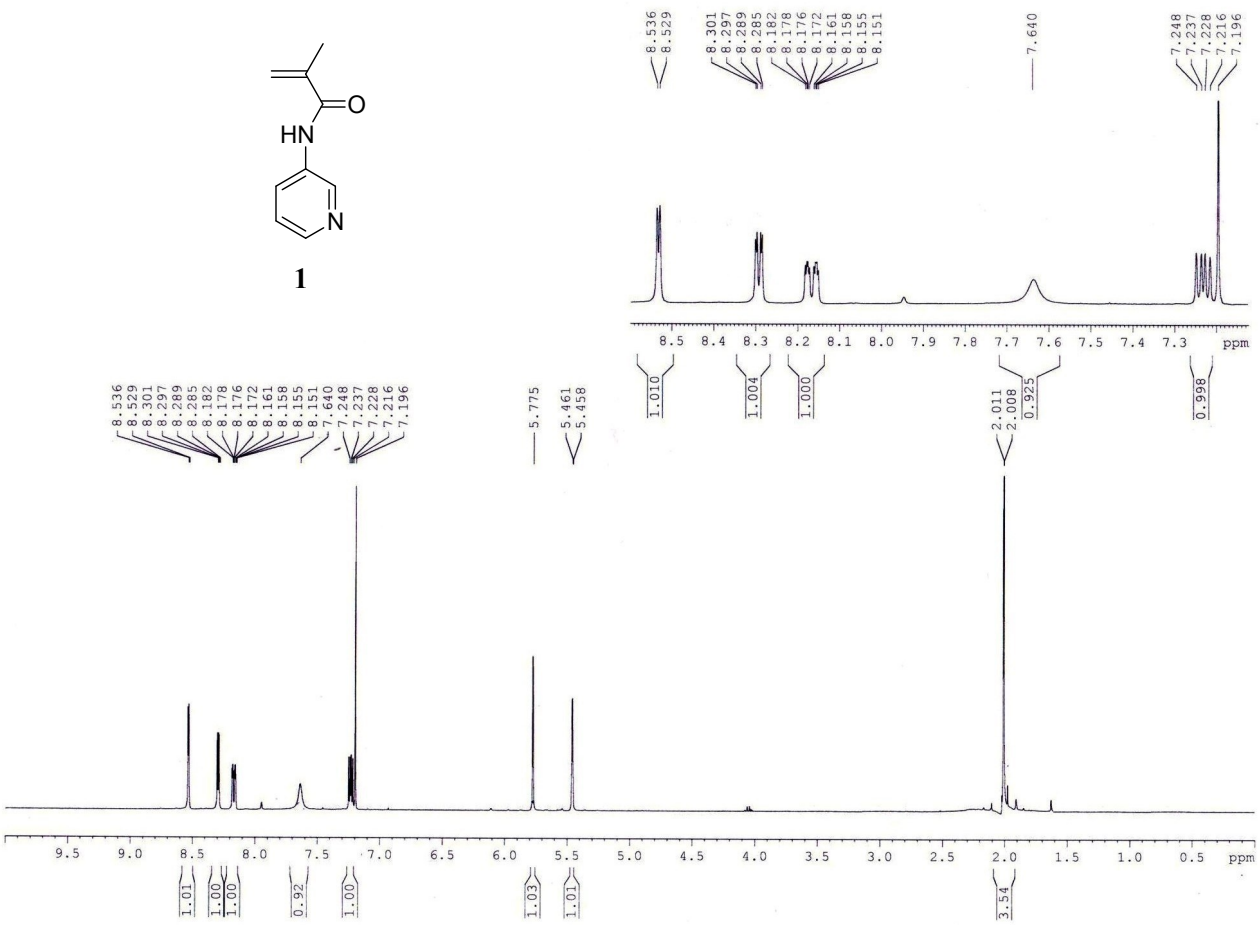
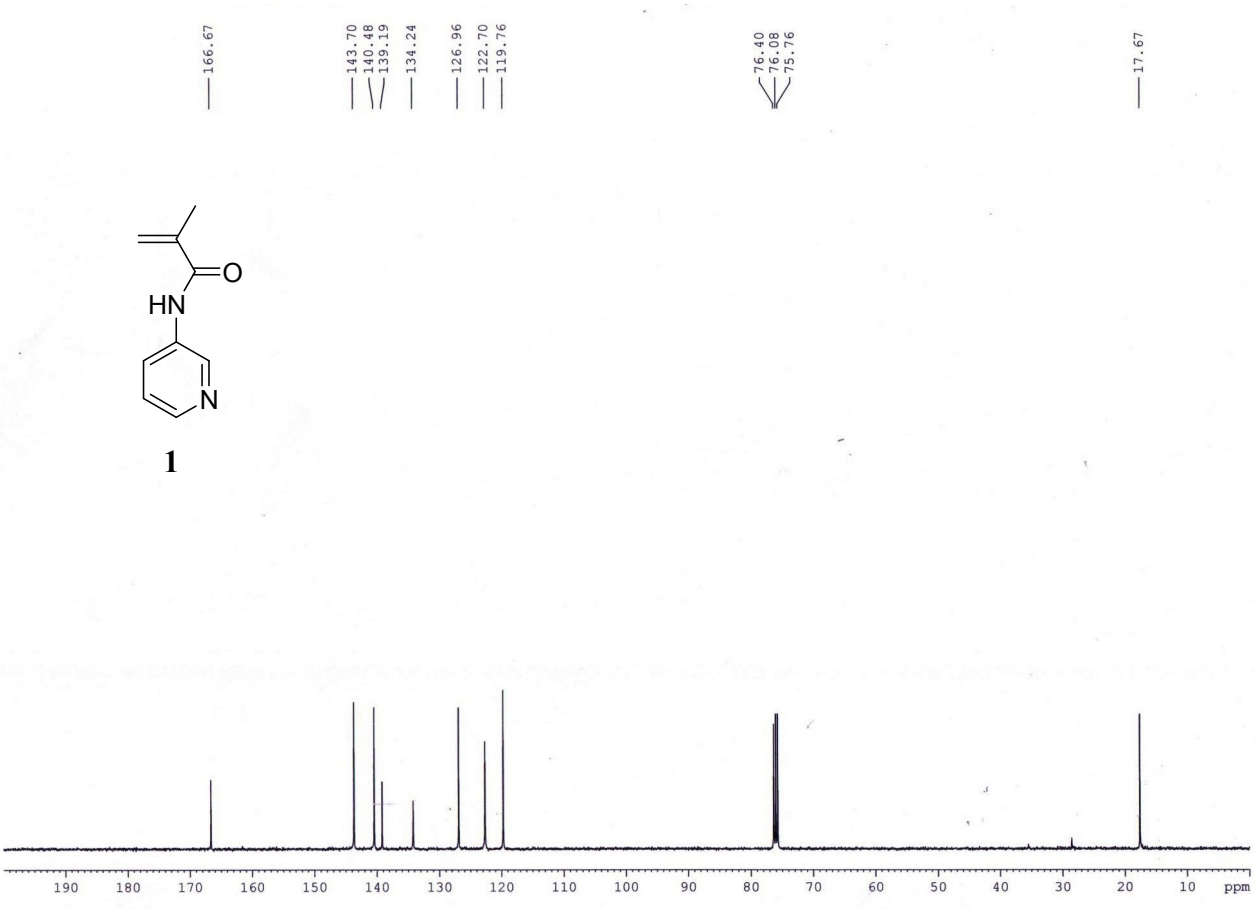


^{1}H NMR of 1 in $CDCl_3$ (400 MHz)



^{13}C NMR of 1 in $CDCl_3$ (100 MHz)



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Mass spectrum of 1

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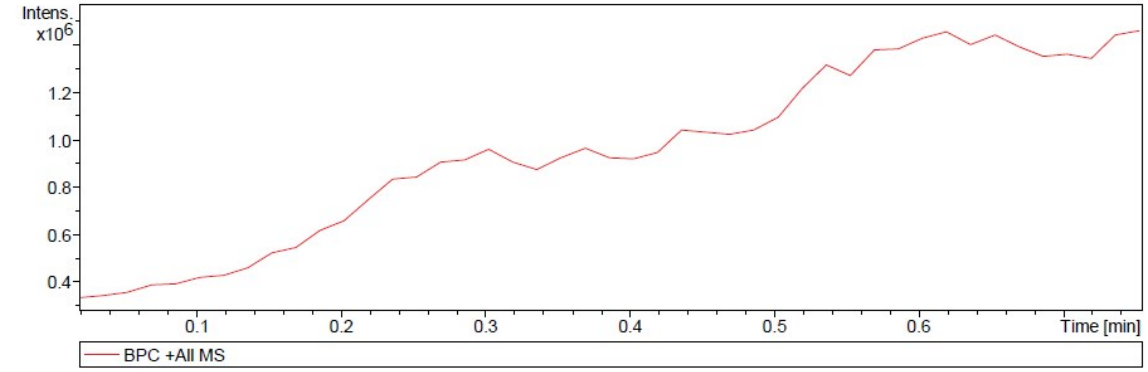

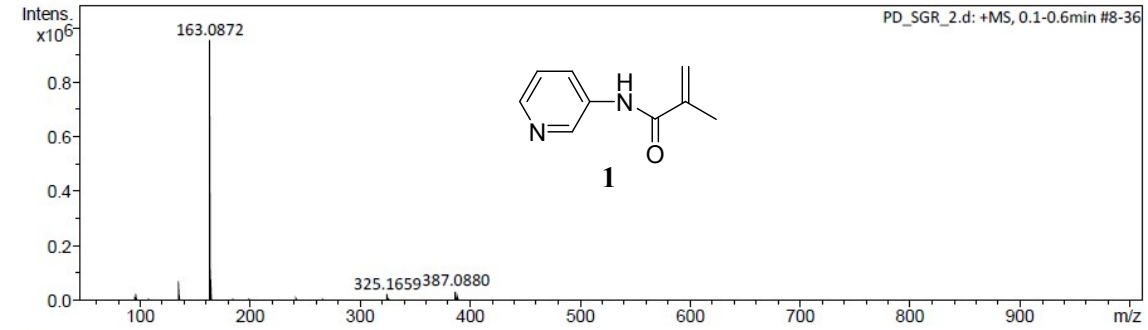

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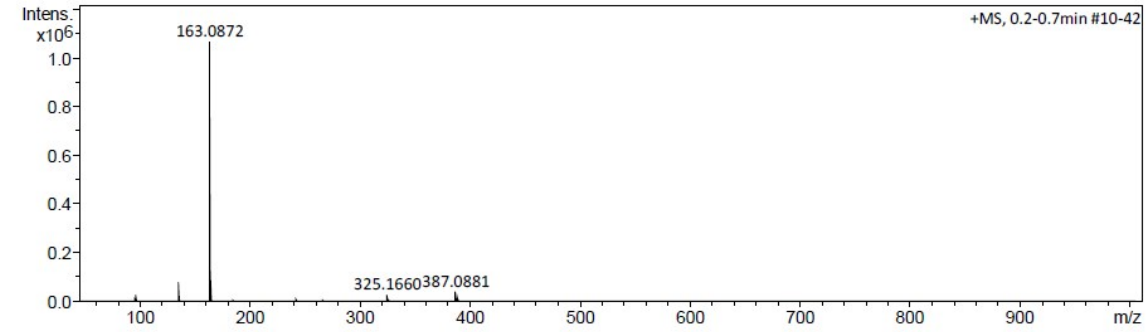
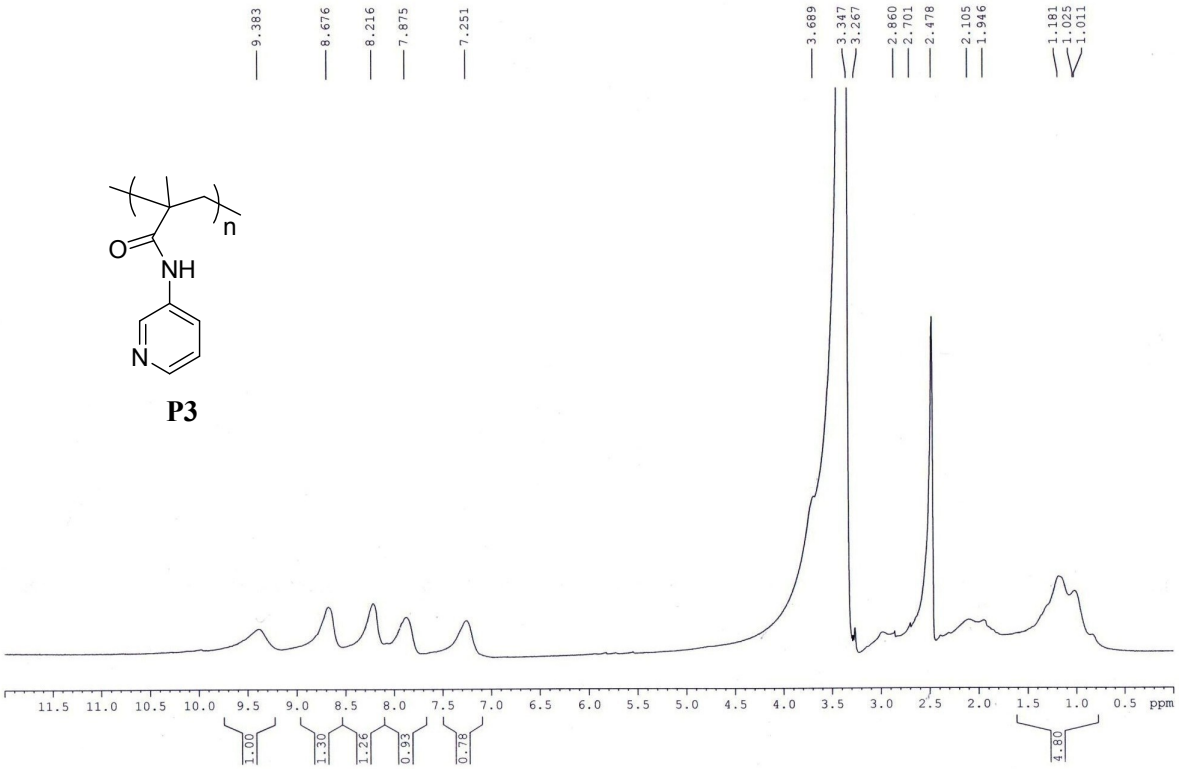
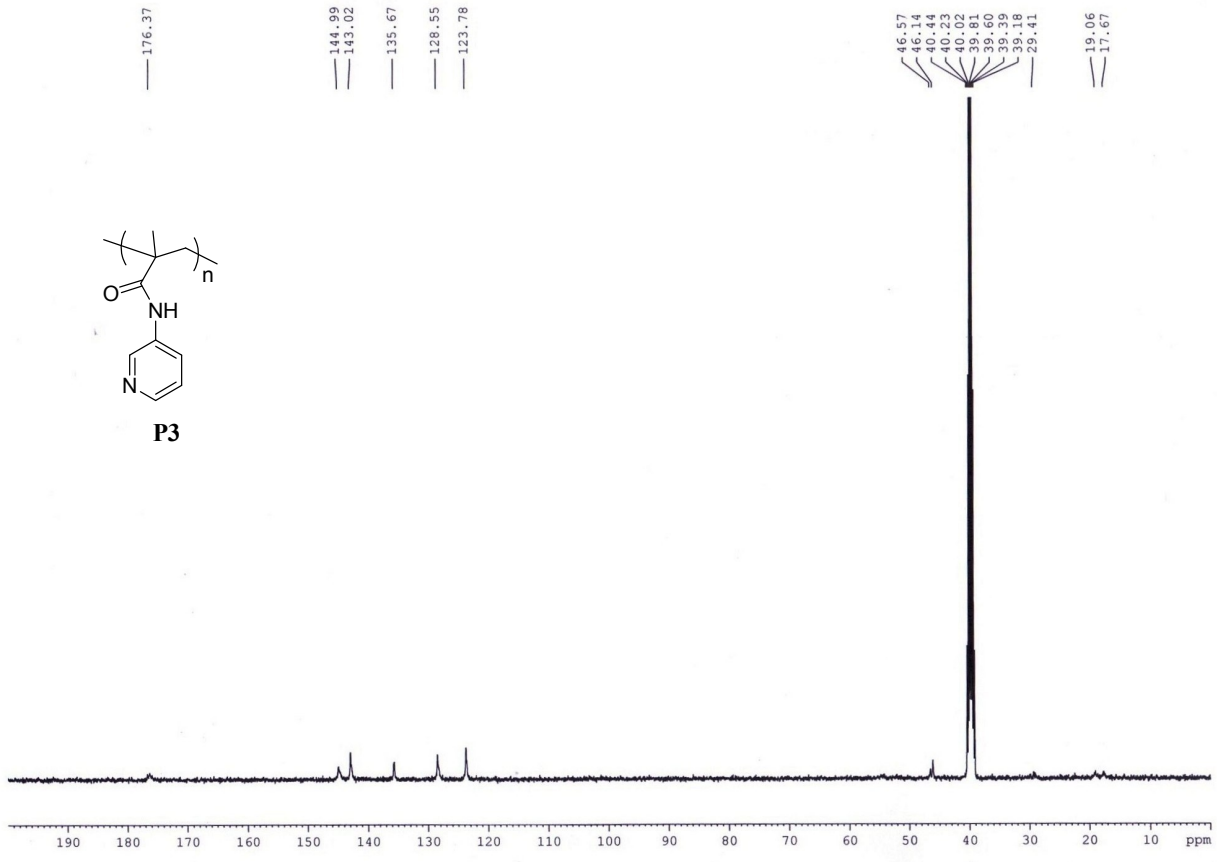


^{1}H NMR of P3 in d_6-DMSO (400 MHz)



P3

^{13}C NMR of P3 in d_6-DMSO (100 MHz)



P3