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SUPPORTING INFORMATION

Aggregation Induced Emission Based Fluorescence pH and Temperature Sensors: Probing Polymer Interactions in Poly(*N*-isopropyl acrylamide-co-tetra(phenyl)ethene acrylate)/Poly(methacrylic acid) Interpenetrating Polymer Networks

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Scheme S1. Synthetic routes of monomers (M2 and M3)^{1,2} and corresponding copolymers (P5 and P6).

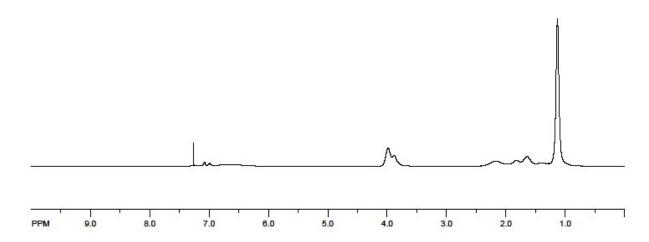
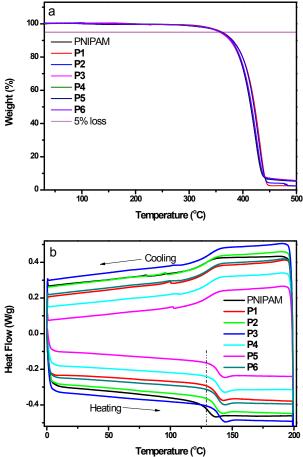


Figure S1. ¹H NMR spectrum of P1 in CDCl₃.



Temperature (°C) Figure S2. (a) TGA thermograms of PNIPAM and P1-6 recorded under nitrogen at a heating rate of 20 °C/min. (b) DSC thermograms of PNIPAM and P1-6 recorded under nitrogen at a heating rate of 10 °C/min.

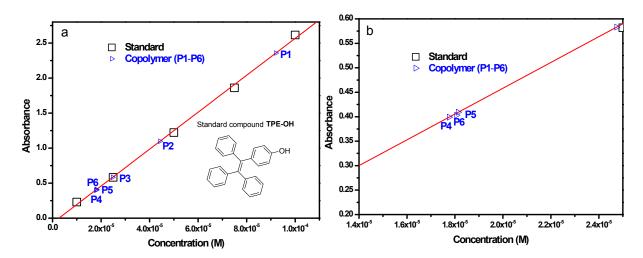
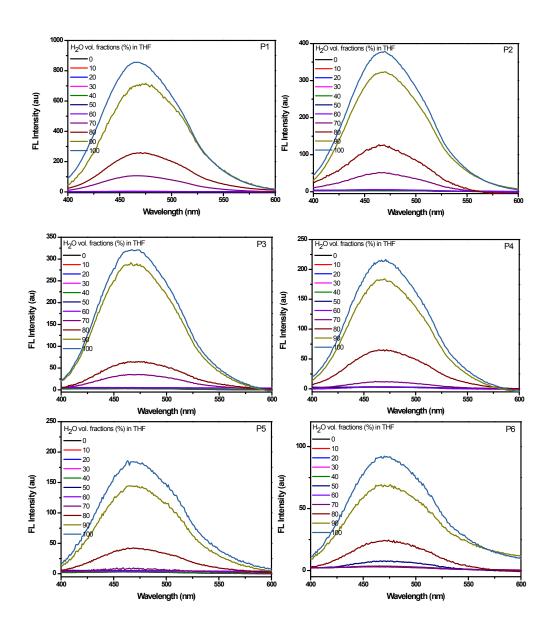


Figure S3. (a) Calibration curve for determination of copolymer composition, using 4-(1,2,2-triphenylvinyl)phenol (TPE-OH) as standard. (b) Enlarged calibration curve for

P4-P6. The absorbance of TPE-OH at 318 nm was recorded in the presence of PNIPAM in THF. [TPE-OH] = 10^{-5} to 10^{-4} M, [PNIPAM] = 0.50 mg/mL, 20 °C. Open squares and circles are the data points for the standard and the copolymers, respectively.



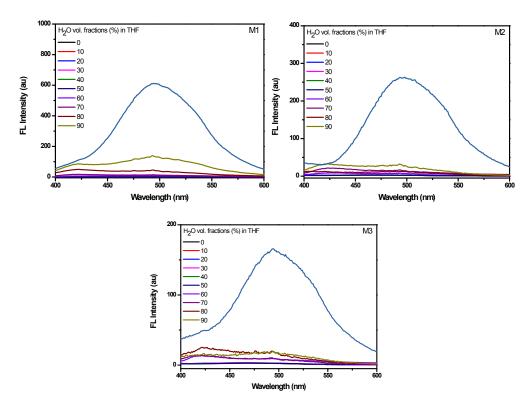


Figure S4. Fluorescence spectra of polymer **P1-6** in THF/H₂O mixtures (λ_{ex} = 318 nm, [**P4**] = 0.5 mg/mL, 20 °C).

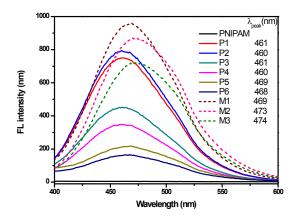


Figure S5. Fluorescence spectra of monomers (M1-3) and copolymers (P1-6) in solid state. Films were fabricated by drop coating of 50.0 μ L THF solution, [C] = 5.0 mg/mL.

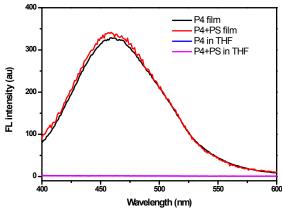


Figure S6. Fluorescence spectra of polymer in solution and film. **P4** and **P4+PS** in THF, [**P4**] = 0.5 mg/mL, [**PS**] = 0.5 mg/mL. **P4** film was fabricated by drop coating of 50.0 μ L THF solution of **P4**, [**P4**] = 5.0 mg/mL. **P4+PS** film was fabricated by drop coating of 50.0 μ L THF solution of **P4** and **PS**, [**P4**] = 5.0 mg/mL, [**PS**] = 5.0 mg/mL.

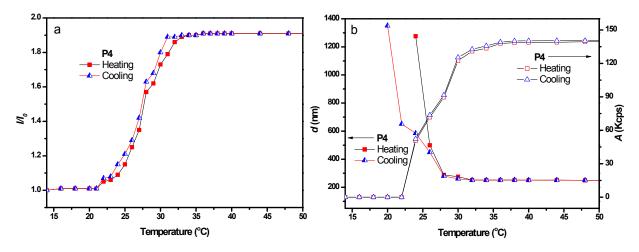


Figure S7. (a) Plot of I/I_0 vs temperature of **P4**. (b) The particle size and solution turbidity (kcps) vs temperature of **P4**. [**P4**] = 0.5 mg/mL, 10.0 mM Na₂HPO₄-citric acid buffer, I_0 and I are the fluorescence intensity at 14 °C and a measured temperature, respectively. The fluorescence intensity was recorded at 469 nm; $\lambda_{\rm ex}$ = 318 nm.

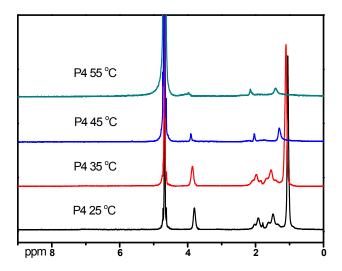


Figure S8. 1 H NMR spectra of **P4** in D $_{2}$ O at various temperatures, [C] = 0.5 mg/mL, scan number = 80.

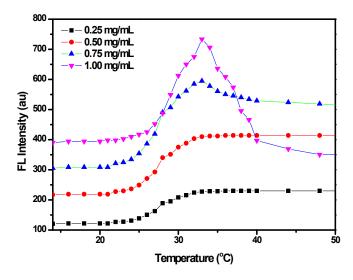


Figure S9. Plot of fluorescence intensity vs temperature of **P4** with different concentration in H₂O. Concentration of copolymers **P4** is 0.25, 0.50 and 1.0 mg/mL, respectively. Fluorescence was measured at 469 nm, excited at 318 nm.

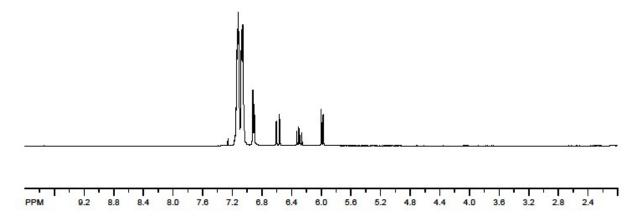


Figure S10. ¹H NMR spectrum of monomer (**M1**).

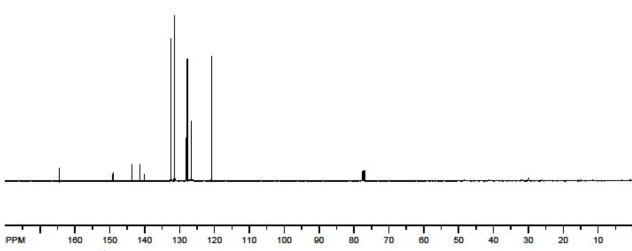


Figure S11. ¹³C NMR spectrum of monomer (M1).

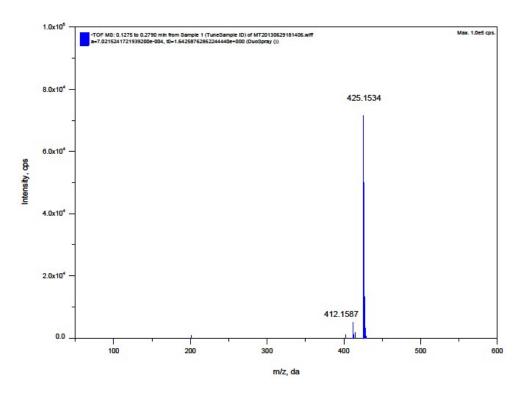


Figure S12. HRMS spectrum of monomer (M1).

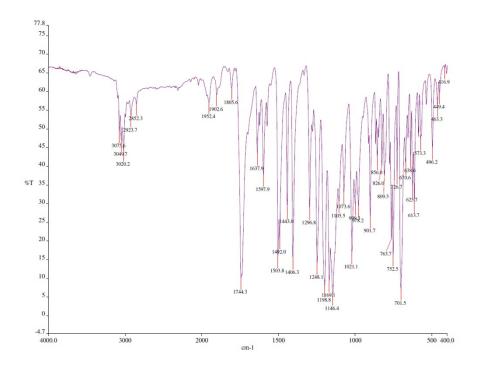


Figure S13. FTIR spectrum of monomer (M1).

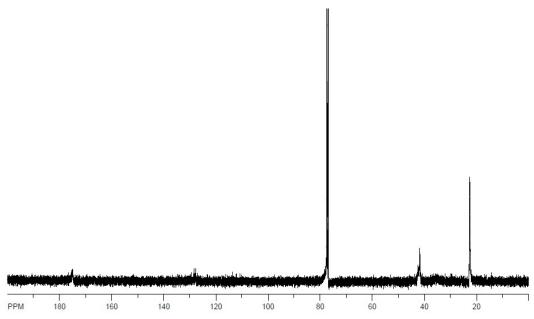


Figure S14. 13 C NMR spectrum of P1 in CDCl₃.

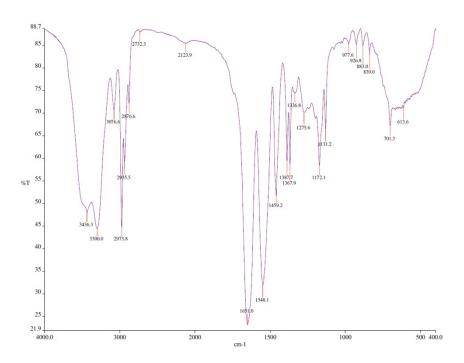


Figure S15. FTIR spectrum of P1.

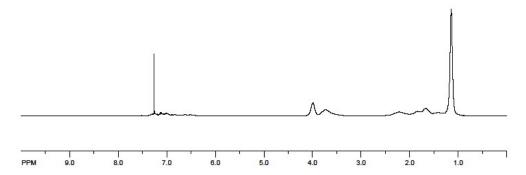


Figure S16. ¹H NMR spectrum of **P2** in CDCl₃.

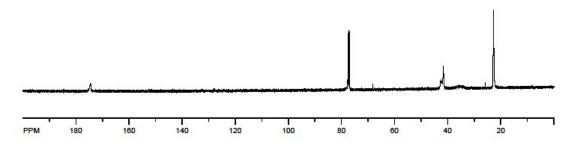


Figure S17. ¹³C NMR spectrum of **P2** in CDCl₃.

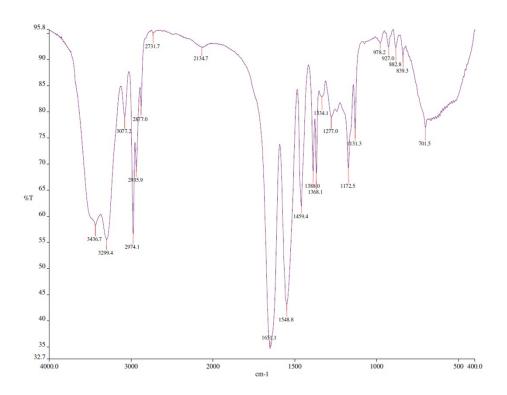


Figure S18. FTIR spectrum of P2.

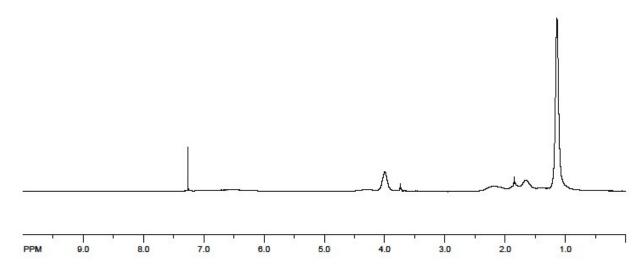


Figure S19. ¹H NMR spectrum of P3 in CDCl₃.

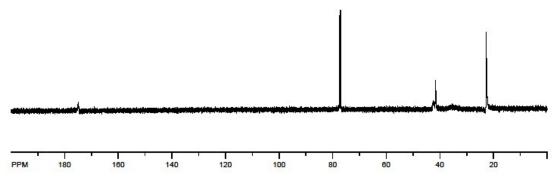


Figure S20. 13 C NMR spectrum of P3 in CDCl₃.

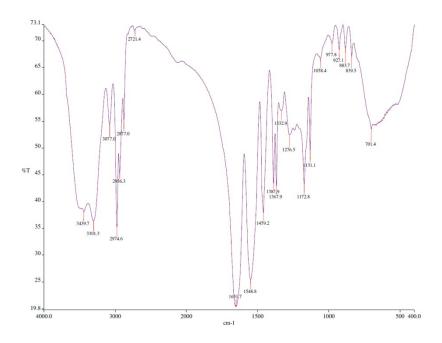


Figure S21. FTIR spectrum of P3.

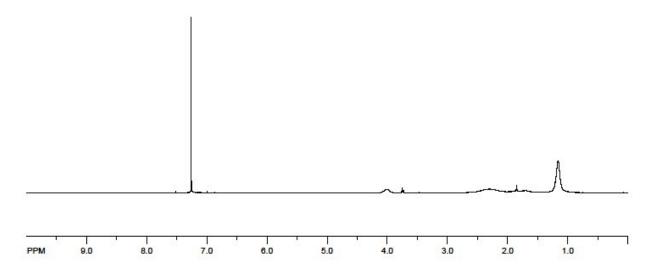


Figure S22. ¹H NMR spectrum of **P4** in CDCl₃.

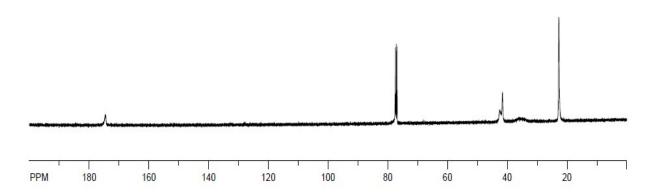


Figure S23. 13 C NMR spectrum of P4 in CDCl₃.

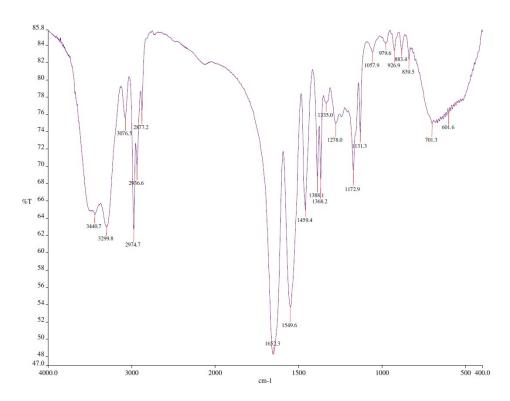


Figure S24. FTIR spectrum of P4.

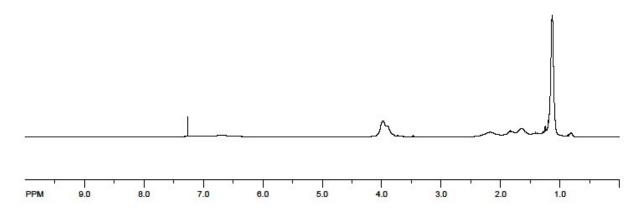


Figure S25. ¹H NMR spectrum of P5 in CDCl₃.

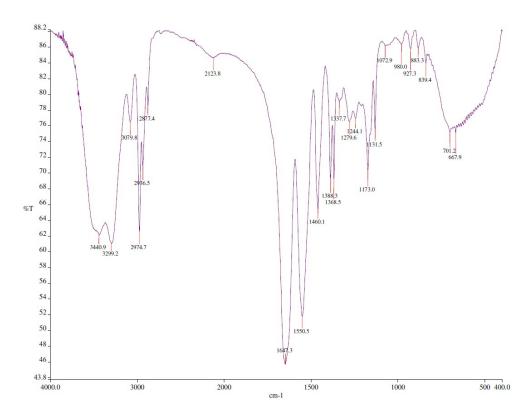


Figure S26. FTIR spectrum of P5.

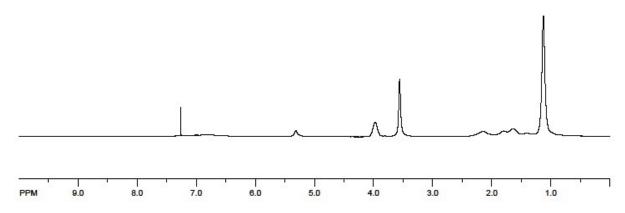


Figure S27. ¹H NMR spectrum of P6 in CDCl₃.

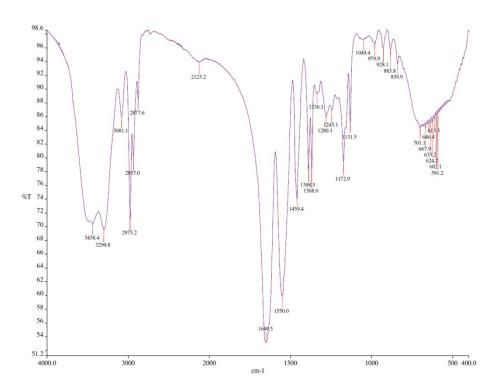


Figure S28. FTIR spectrum of P6.

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- (2) Zhou, H.; Ye, Q.; Neo, W. T.; Song, J.; Yan, H.; Zong, Y.; Tang, B. Z.; Hor, T. S. A.; Xu, J. *Chem. Commun.* **2014**, *50*, 13785.