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) and corresponding copolymers (P5 and P6).

Figure S1. $^1$H NMR spectrum of P1 in CDCl$_3$.

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/H$_2$O mixtures ($\lambda_{ex}$ = 318 nm, [P4] = 0.5 mg/mL, 20 °C).

Figure S5. Fluorescence spectrum of monomers (M1-3) and copolymers (P1-6) in solid state. Films were fabricated by drop coating of 50.0 µL 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 µL THF solution of P4, [P4] = 5.0 mg/mL. P4+PS film was fabricated by drop coating of 50.0 µL 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 Na$_2$HPO$_4$-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; $\lambda_{ex}$ = 318 nm.

Figure S8. $^1$H NMR spectra of P4 in D$_2$O at various temperatures.

Figure S9. Plot of fluorescence intensity vs temperature of P4 with different concentration in H$_2$O. 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. $^1$H NMR spectrum of monomer (M1).

Figure S11. $^{13}$C NMR spectrum of monomer (M1).

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Figure S27. $^1$H NMR spectrum of P6 in CDCl$_3$. 
Figure S28. FTIR spectrum of P6.

REFERENCES