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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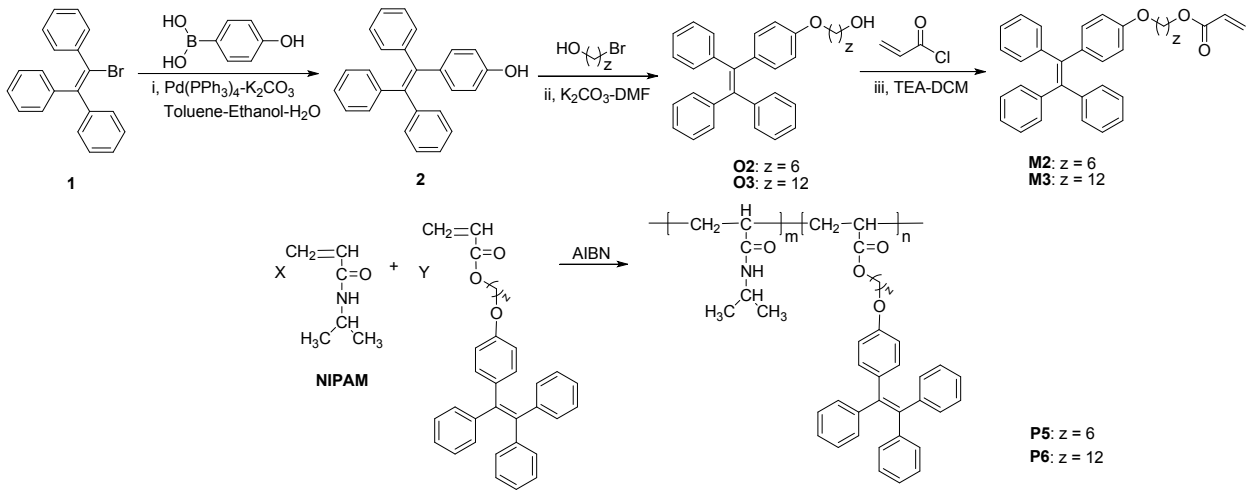
Table content



Scheme S1. Synthetic routes of monomers (**M2** and **M3**)[1,2] and corresponding copolymers (**P5** and **P6**).

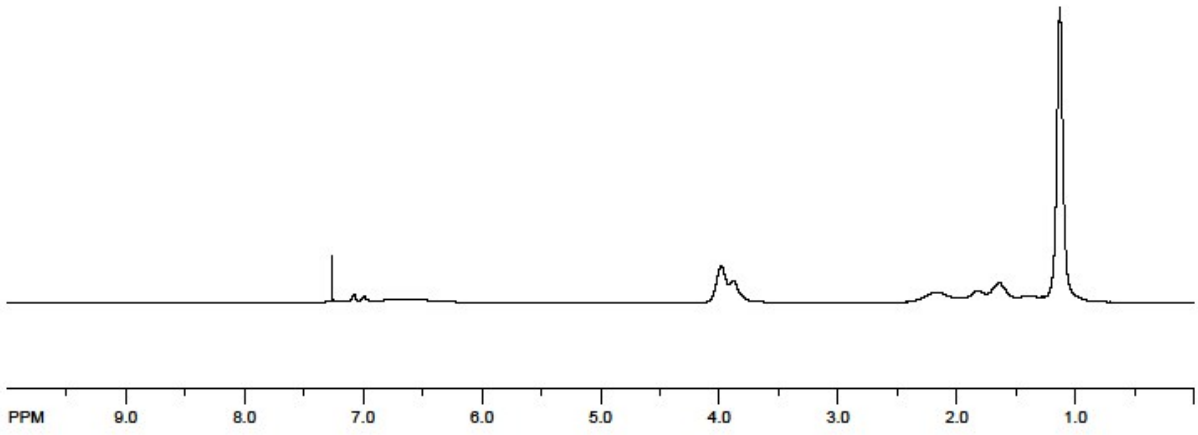


Figure S1. ^{1}H NMR spectrum of **P1** in $CDCl_3$.

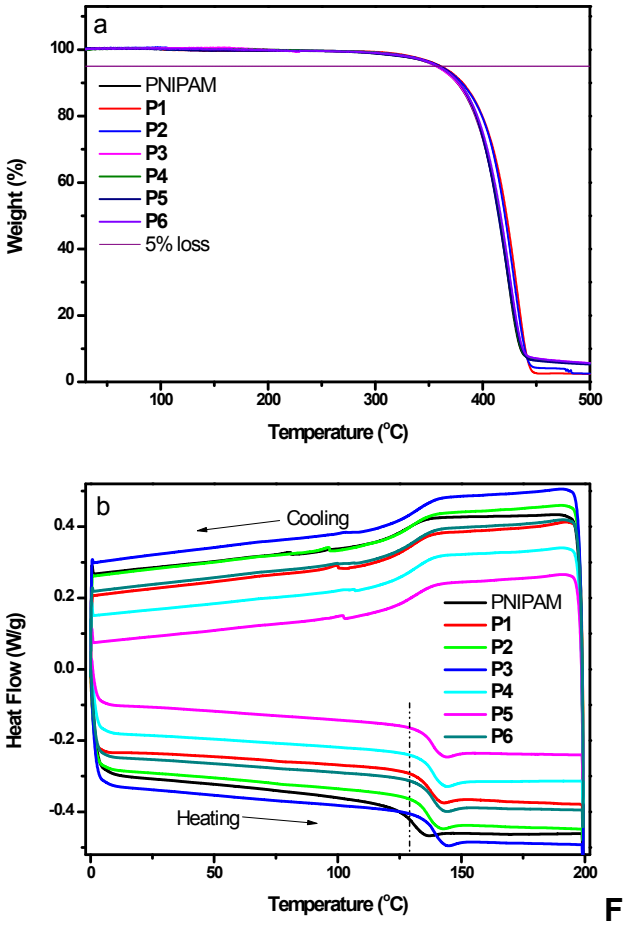


Figure S2. (a) TGA thermograms of PNIPAM and **P1**-**6** recorded under nitrogen at a heating rate of 20 °C/min. (b) DSC thermograms of PNIPAM and **P1**-**6** recorded under nitrogen at a heating rate of 10 °C/min.

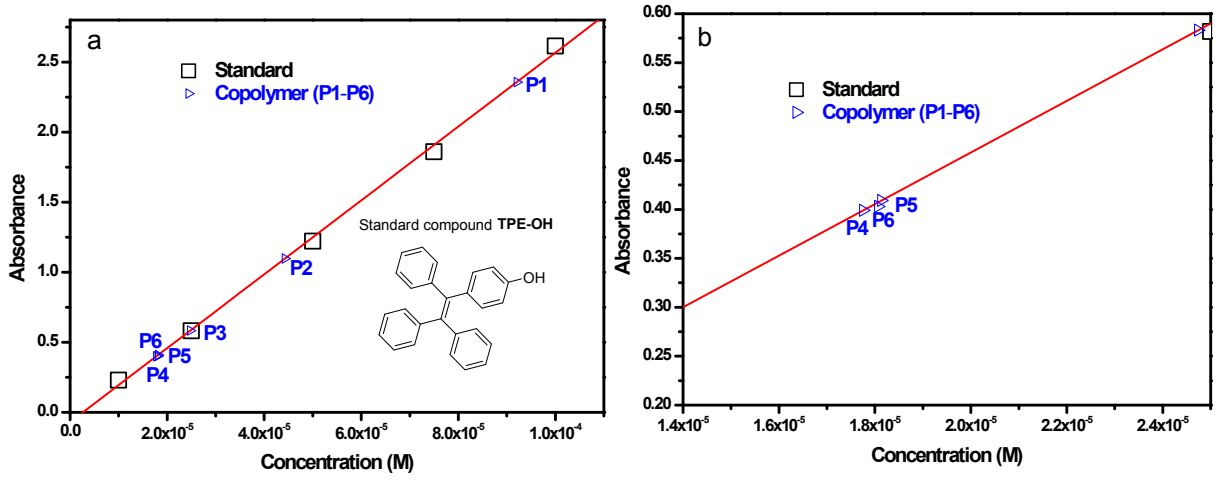
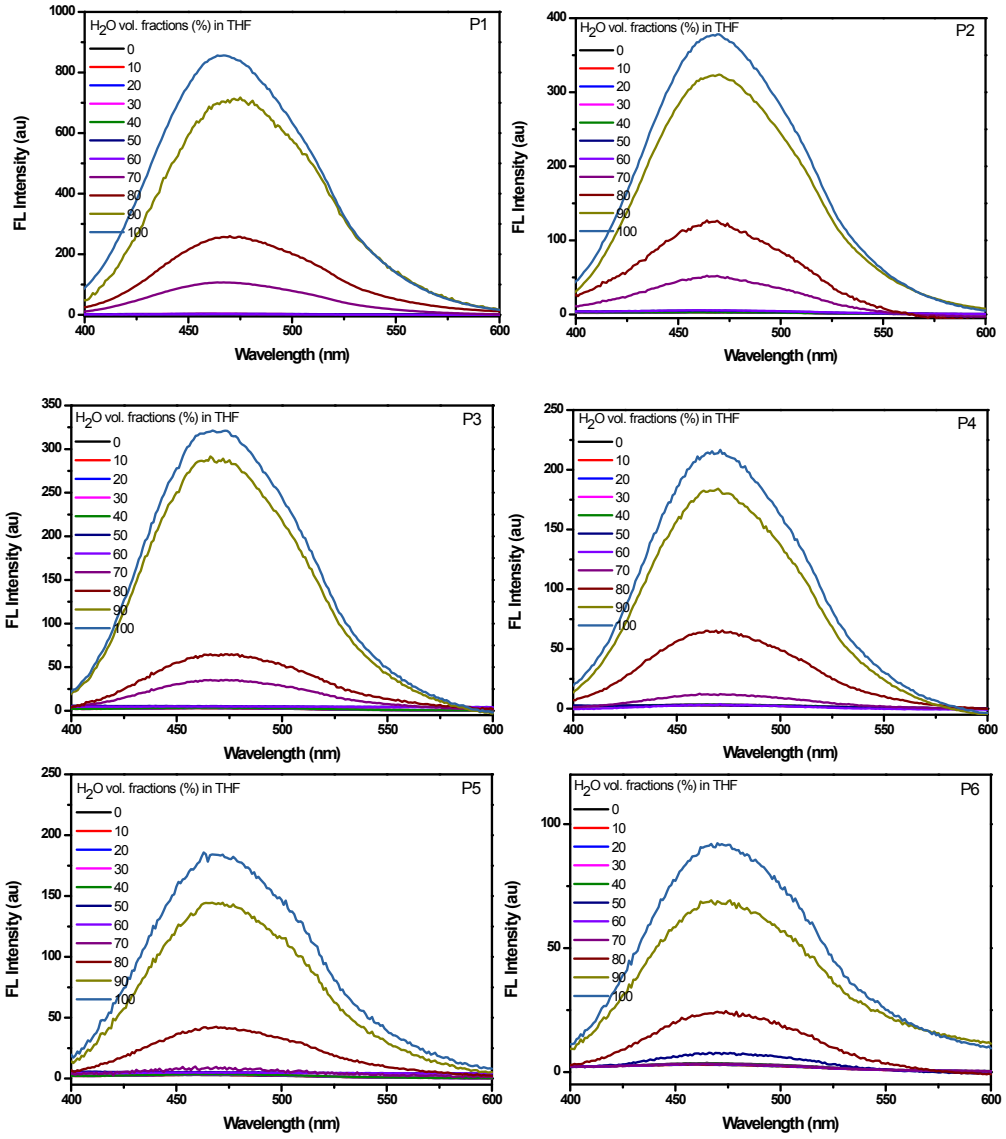


Figure S3. (a) Calibration curve for determination of copolymer composition, using 4-(1,2,2-triphenylvinyl)phenol (TPE-OH) as standard. (b) Enlarged calibration curve for

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 ^{o}C. Open squares and circles are the data points for the standard and the copolymers, respectively.



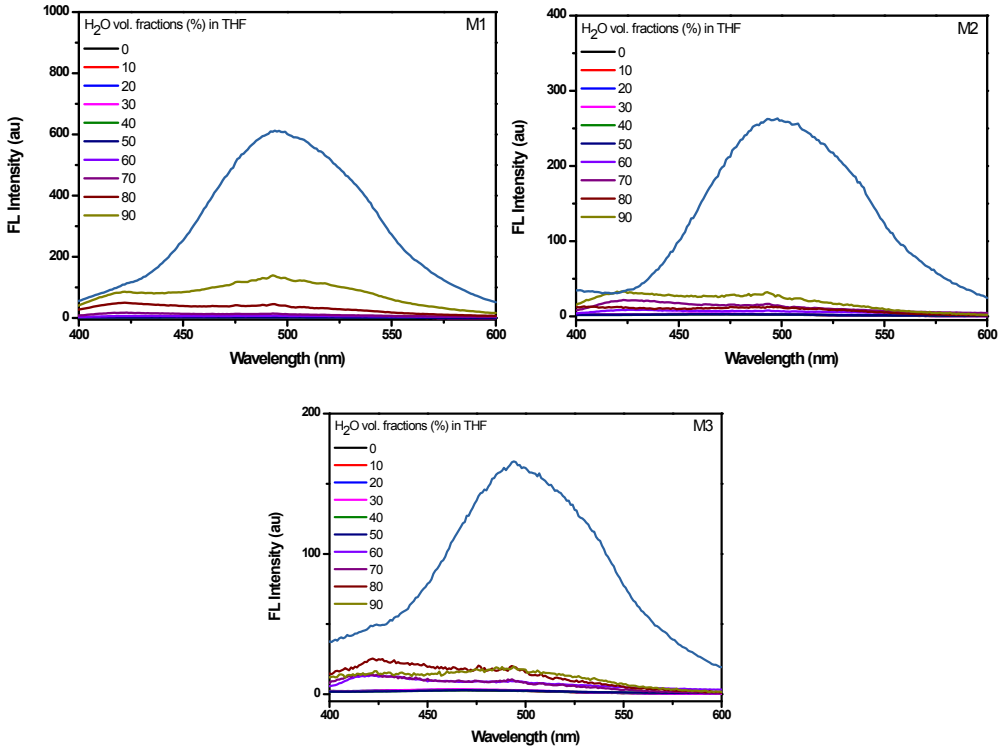


Figure S4. Fluorescence spectra of polymer **P1-6** in THF/H_2O mixtures (λ_{ex} = 318 nm, [**P4**] = 0.5 mg/mL, 20 °C).

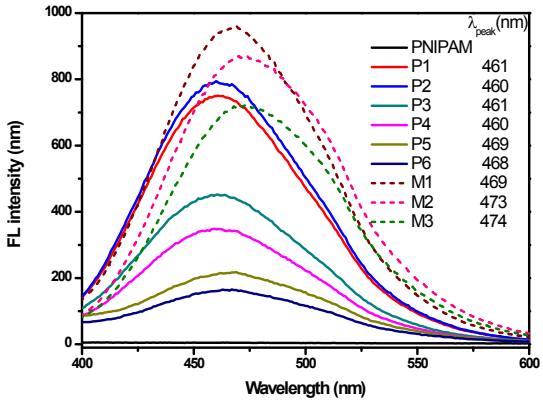


Figure S5. Fluorescence spectra of monomers (**M1**-**3**) and copolymers (**P1**-**6**) in solid state. Films were fabricated by drop coating of 50.0 μL THF solution, [C] = 5.0 mg/mL.

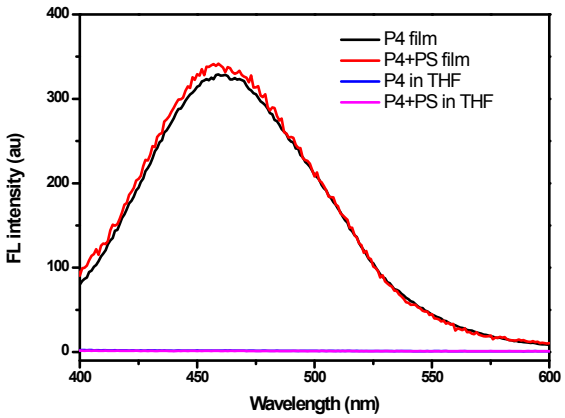


Figure S6. Fluorescence spectra of polymer in solution and film. **P4** and **P4**+**PS** in THF, [**P4**] = 0.5 mg/mL, [**PS**] = 0.5 mg/mL. **P4** film was fabricated by drop coating of 50.0 μL THF solution of **P4**, [**P4**] = 5.0 mg/mL. **P4**+**PS** film was fabricated by drop coating of 50.0 μL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

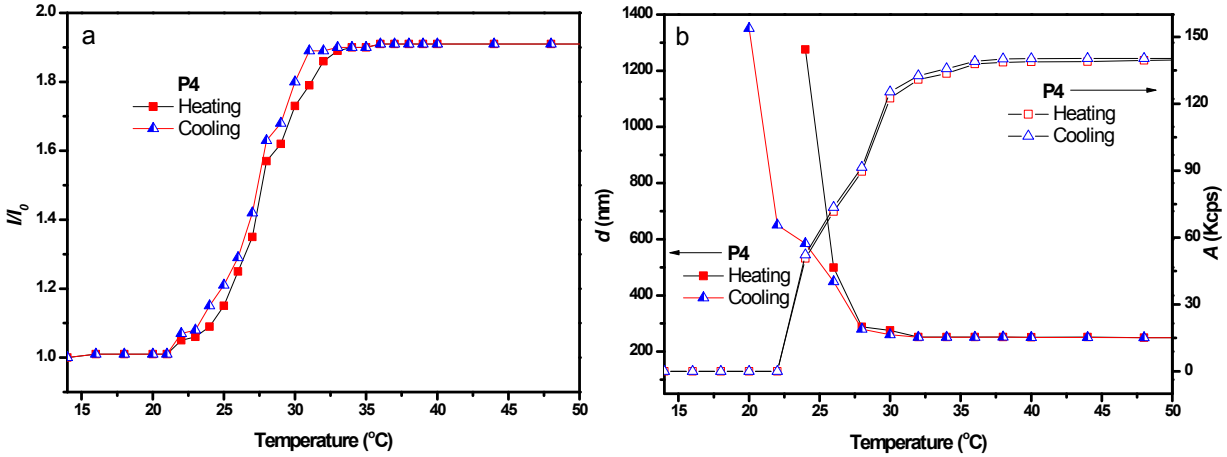


Figure S7. (a) Plot of I/I_0 *vs* temperature of **P4**. (b) The particle size and solution turbidity (kcps) *vs* temperature of **P4**. [**P4**] = 0.5 mg/mL, 10.0 mM Na_2HPO_4-citric acid buffer, I_0 and I are the fluorescence intensity at 14 °C and a measured temperature, respectively. The fluorescence intensity was recorded at 469 nm; λ_{ex} = 318 nm.

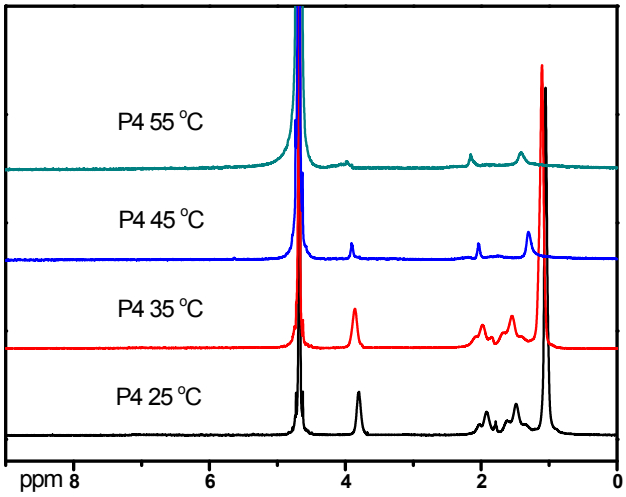


Figure S8. ^{1}H NMR spectra of **P4** in D_2O at various temperatures, [C] = 0.5 mg/mL, scan number = 80.

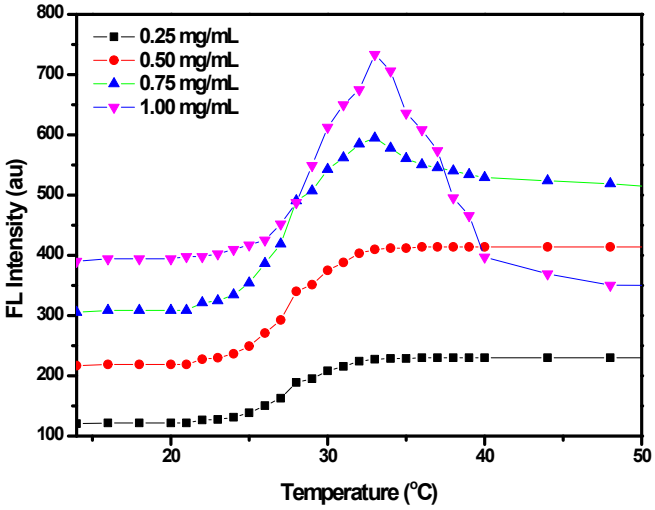


Figure S9. Plot of fluorescence intensity *vs* temperature of **P4** with different concentration in H_2O. Concentration of copolymers **P4** is 0.25, 0.50 and 1.0 mg/mL, respectively. Fluorescence was measured at 469 nm, excited at 318 nm.

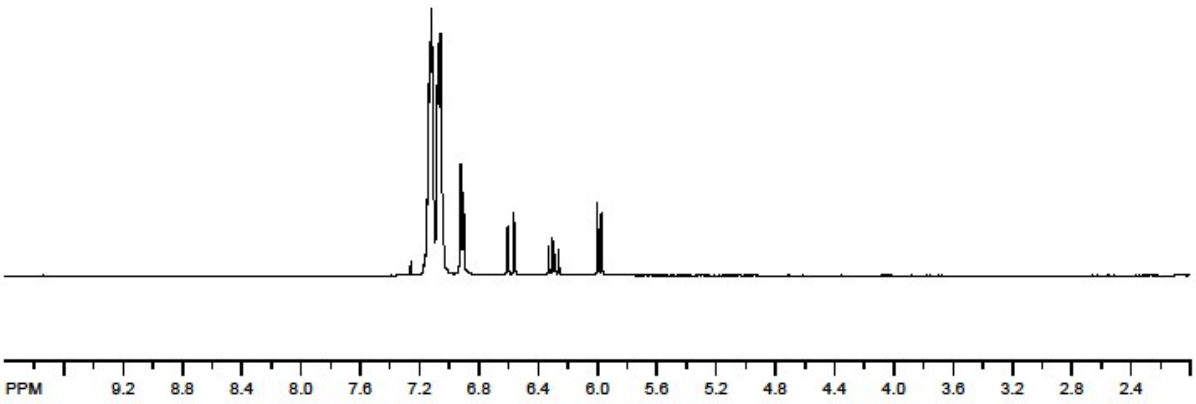


Figure S10. ^{1}H NMR spectrum of monomer (**M1**).

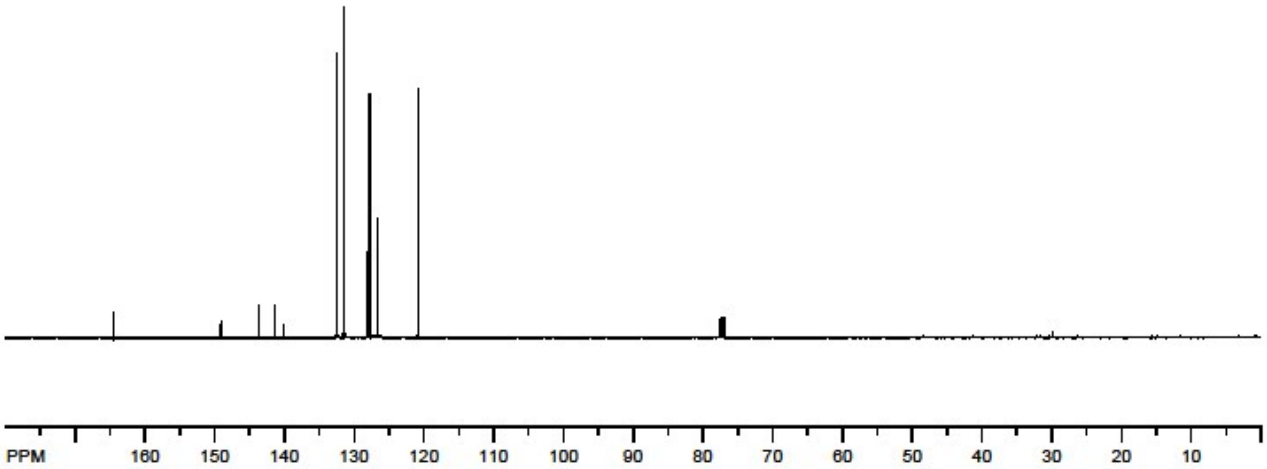


Figure S11. ^{13}C NMR spectrum of monomer (**M1**).

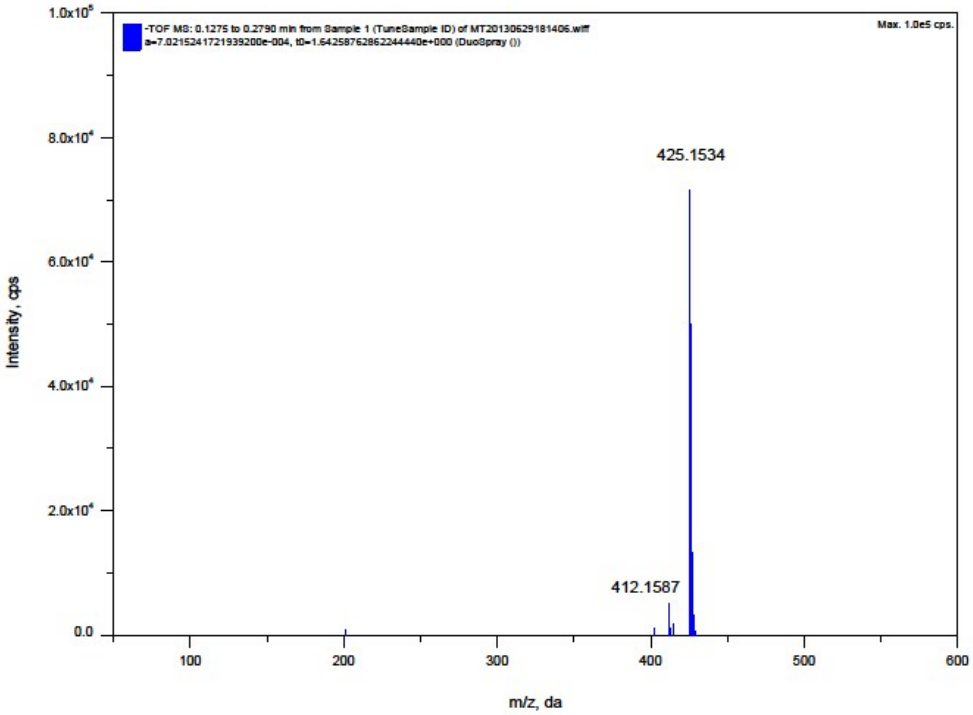


Figure S12. HRMS spectrum of monomer (**M1**).

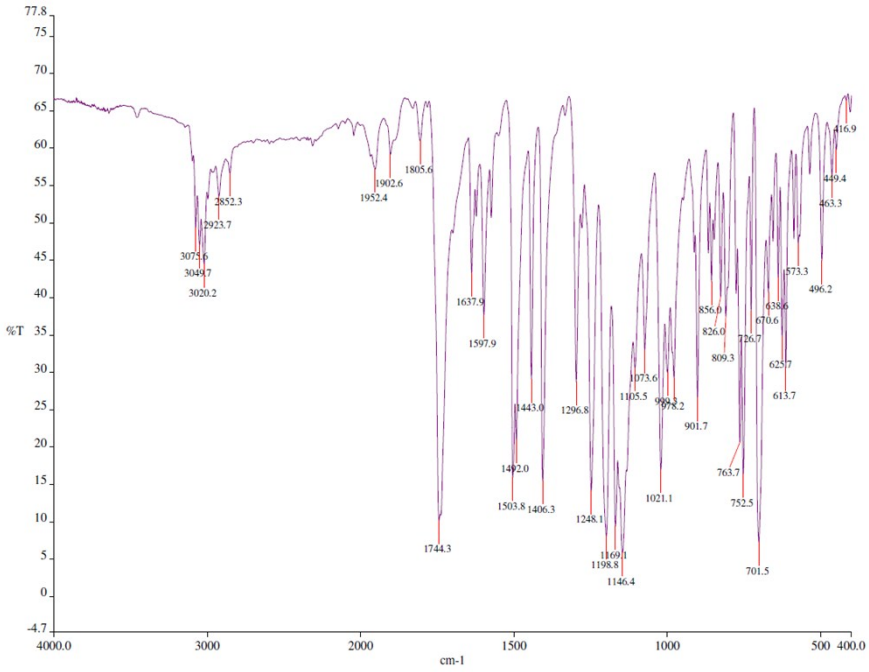


Figure S13. FTIR spectrum of monomer (**M1**).

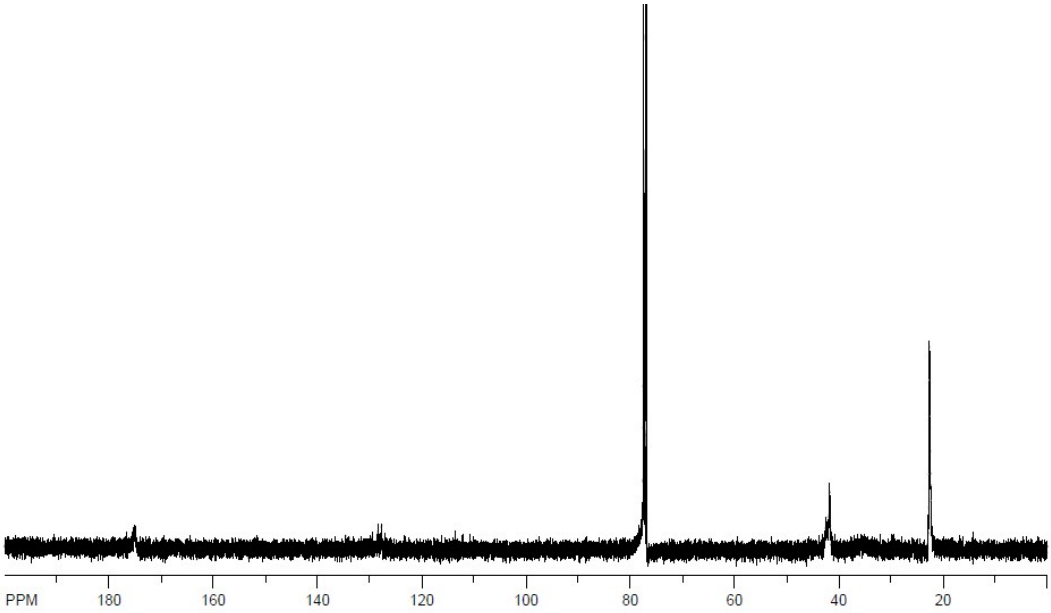


Figure S14. ^{13}C NMR spectrum of **P1** in $CDCl_3$.

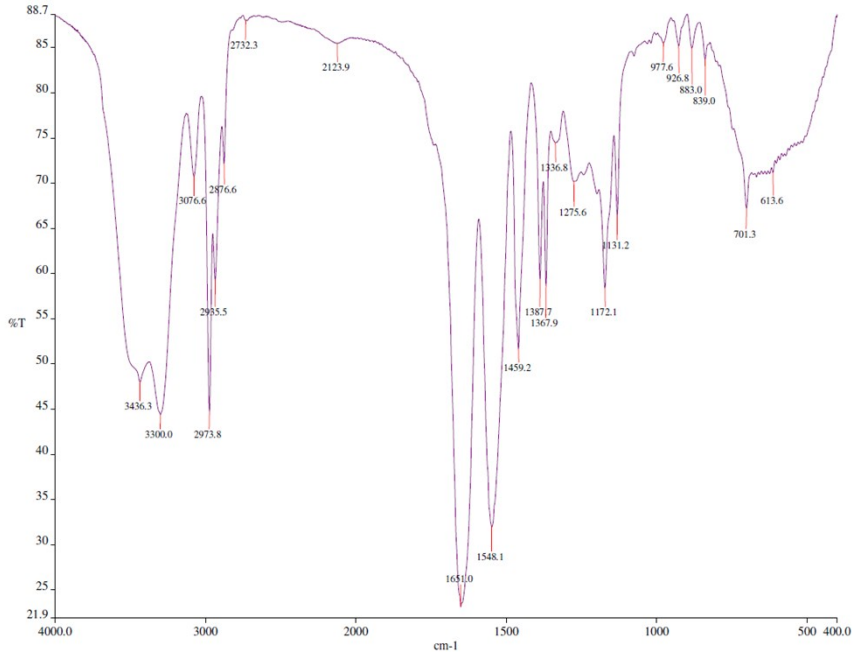


Figure S15. FTIR spectrum of **P1**.

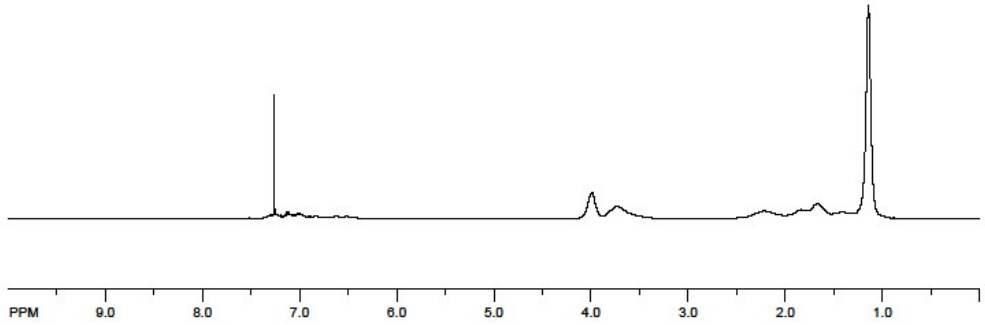


Figure S16. ^{1}H NMR spectrum of **P2** in $CDCl_3$.

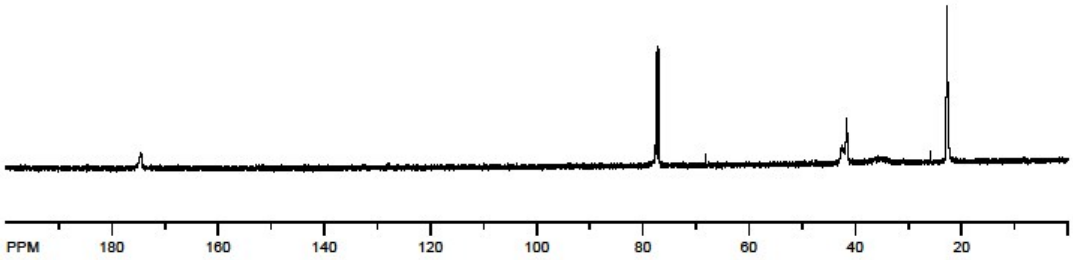


Figure S17. ^{13}C NMR spectrum of **P2** in $CDCl_3$.

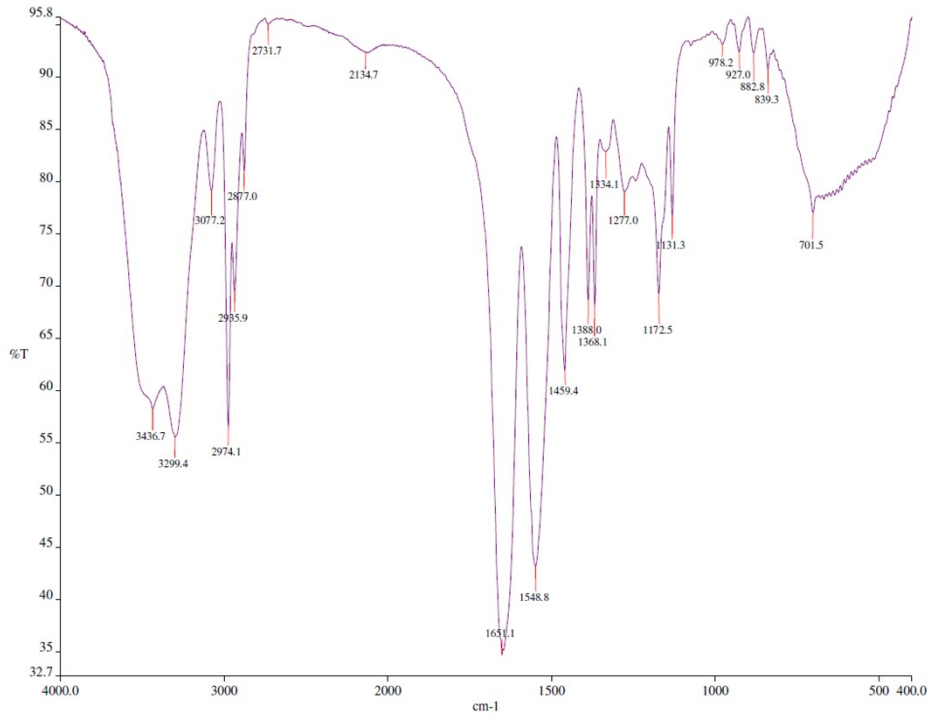


Figure S18. FTIR spectrum of **P2**.

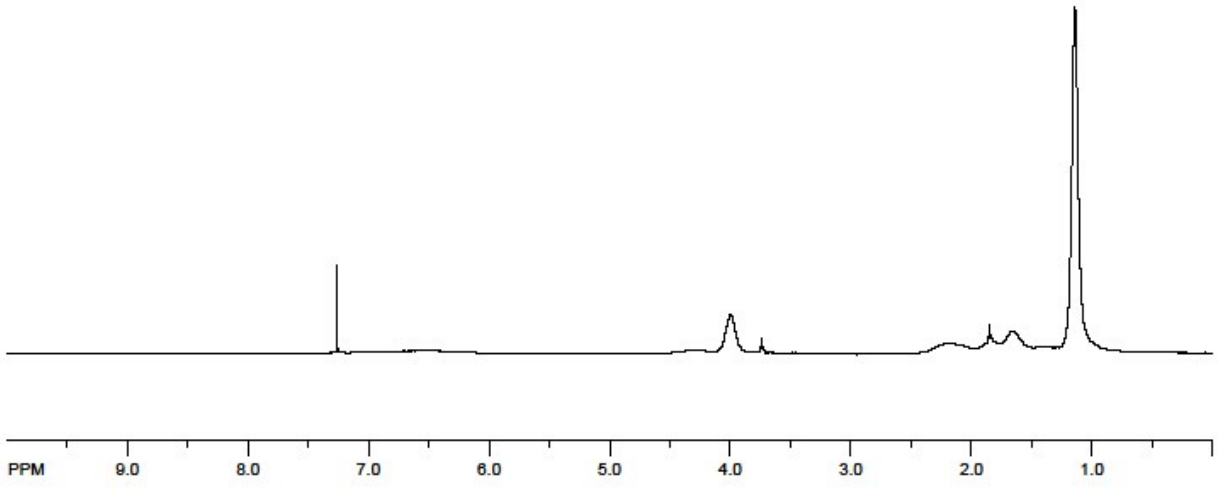


Figure S19. ^{1}H NMR spectrum of **P3** in $CDCl_3$.

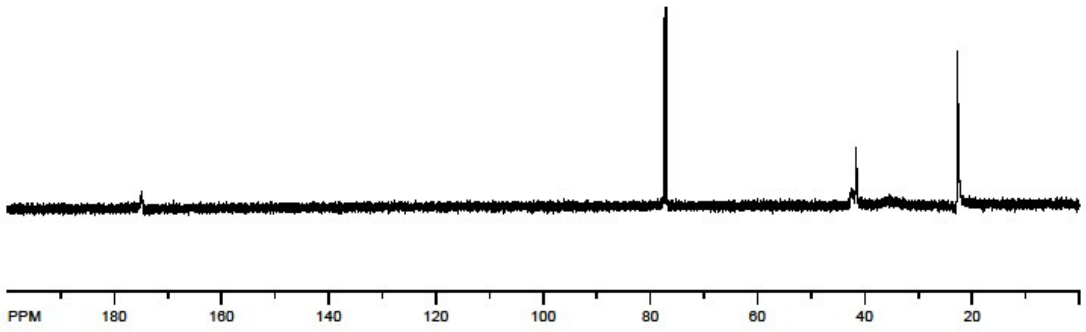


Figure S20. ^{13}C NMR spectrum of **P3** in $CDCl_3$.

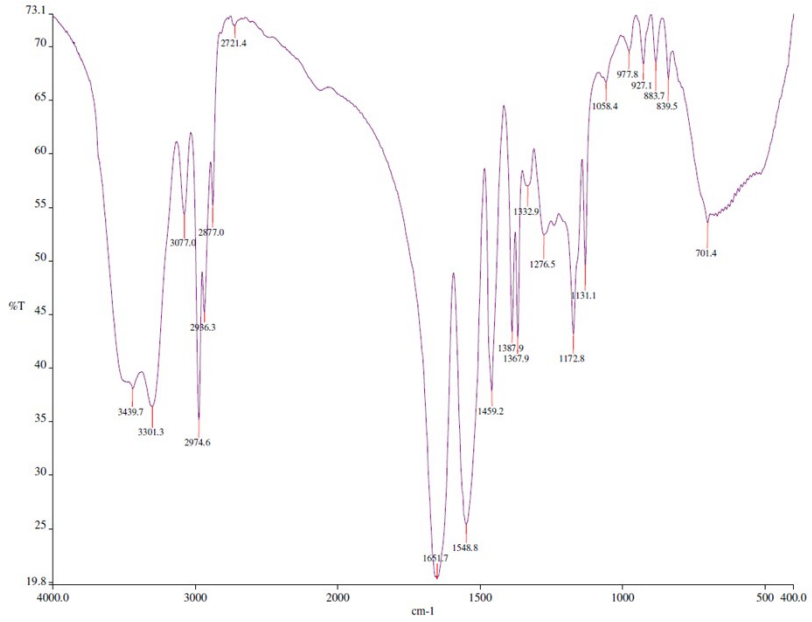


Figure S21. FTIR spectrum of **P3**.

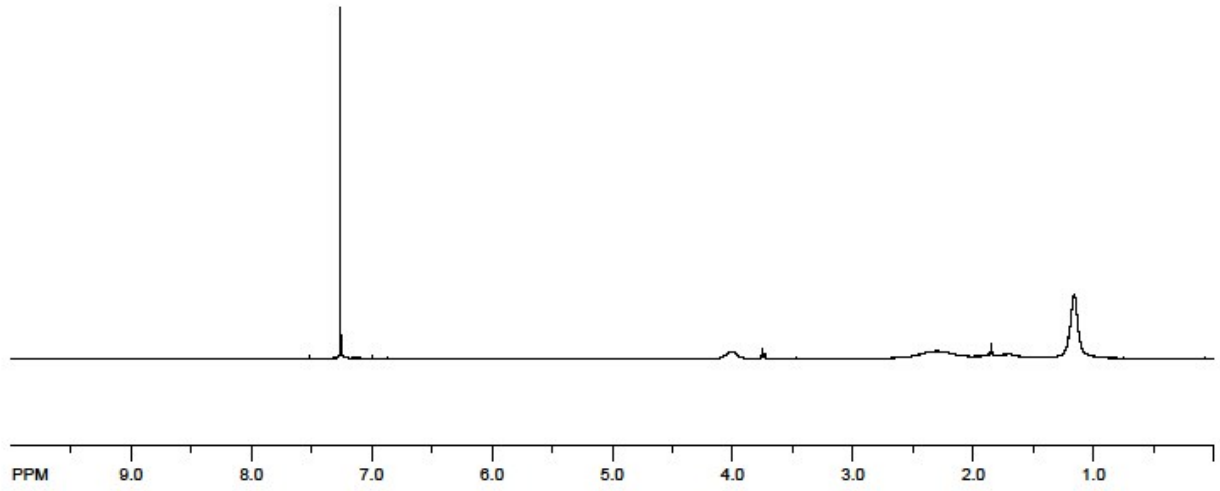


Figure S22. ^{1}H NMR spectrum of **P4** in $CDCl_3$.

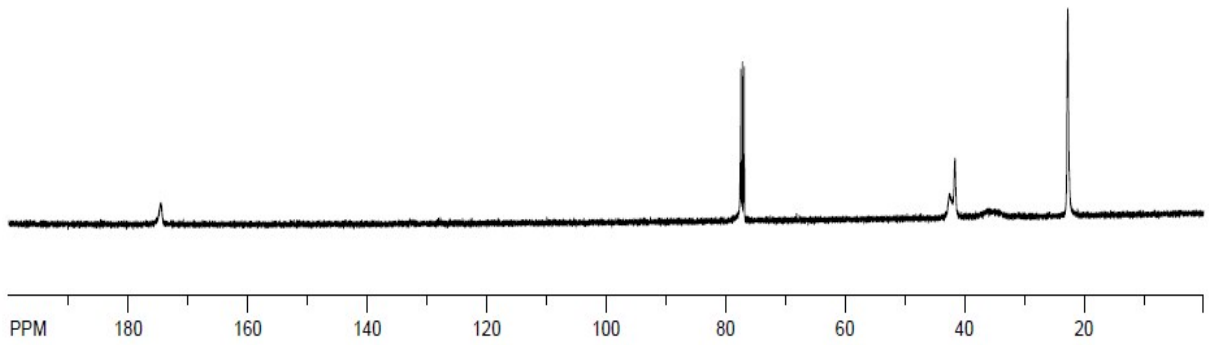


Figure S23. ^{13}C NMR spectrum of **P4** in $CDCl_3$.

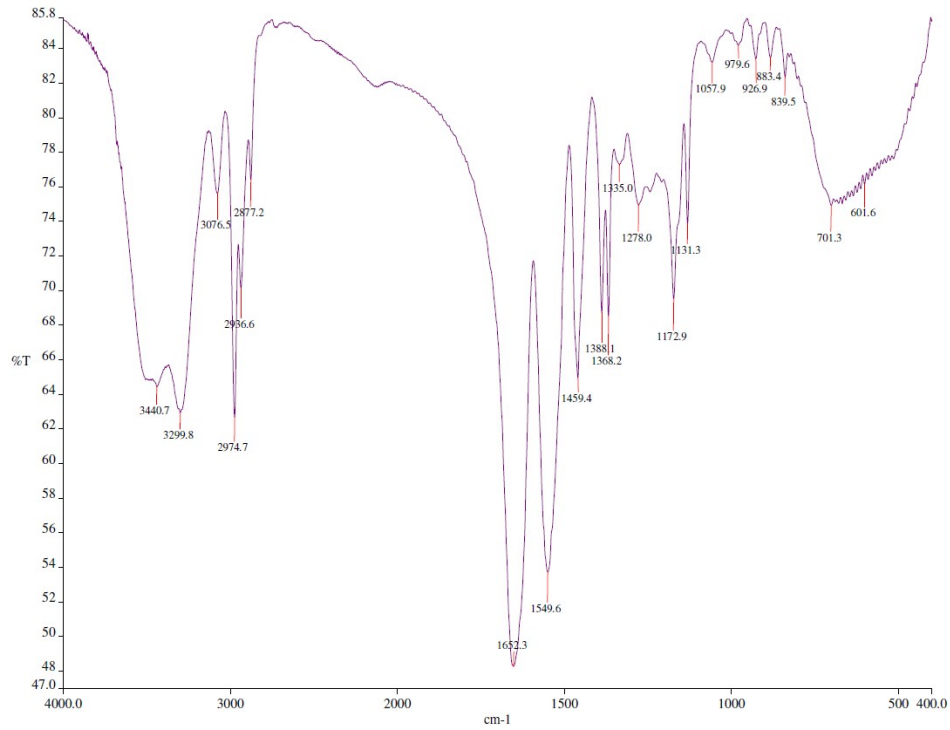


Figure S24. FTIR spectrum of **P4**.

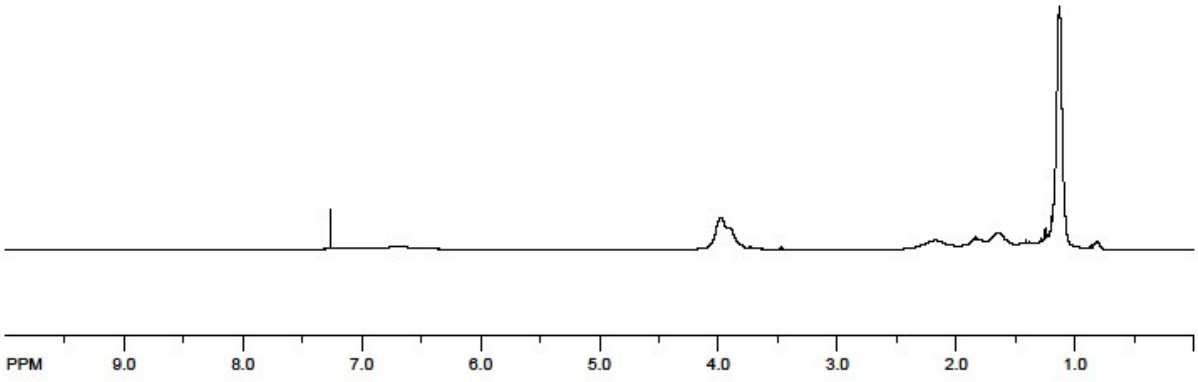


Figure S25. ^{1}H NMR spectrum of **P5** in $CDCl_3$.

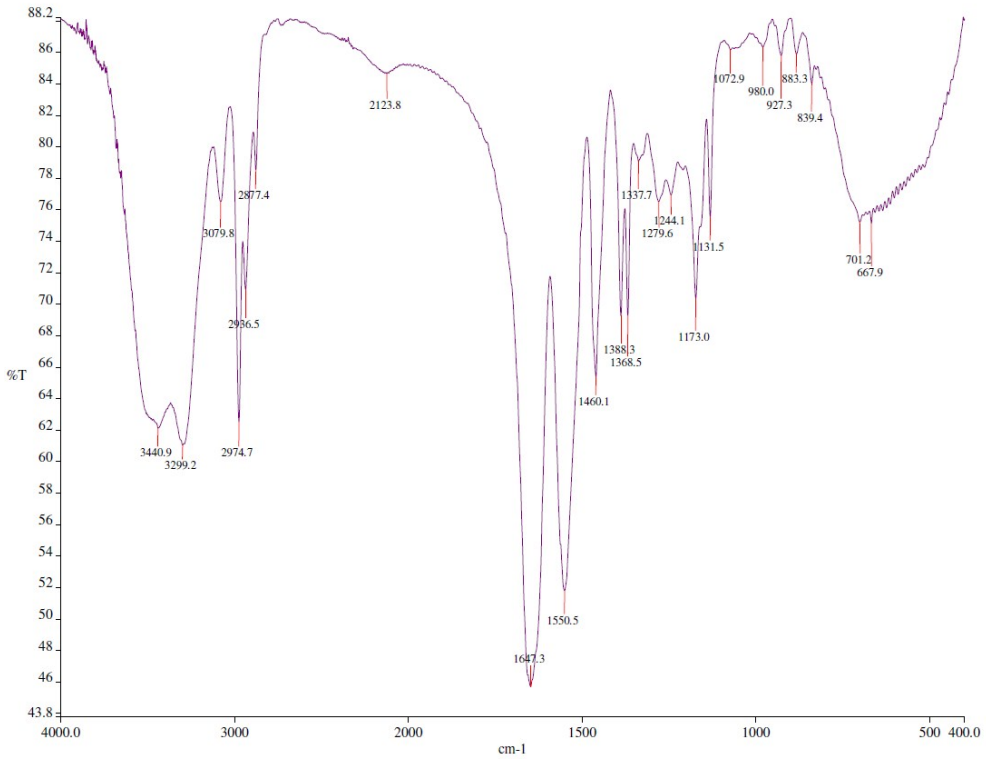


Figure S26. FTIR spectrum of **P5**.

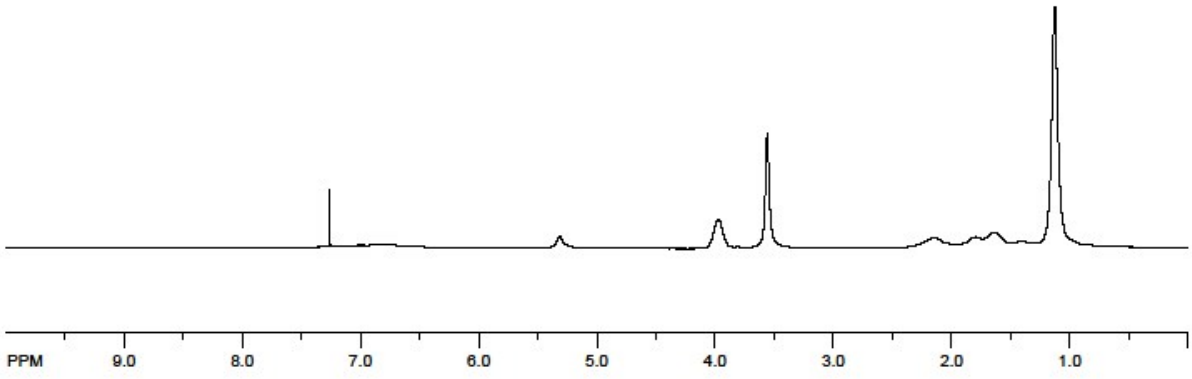


Figure S27. ^{1}H NMR spectrum of **P6** in $CDCl_3$.

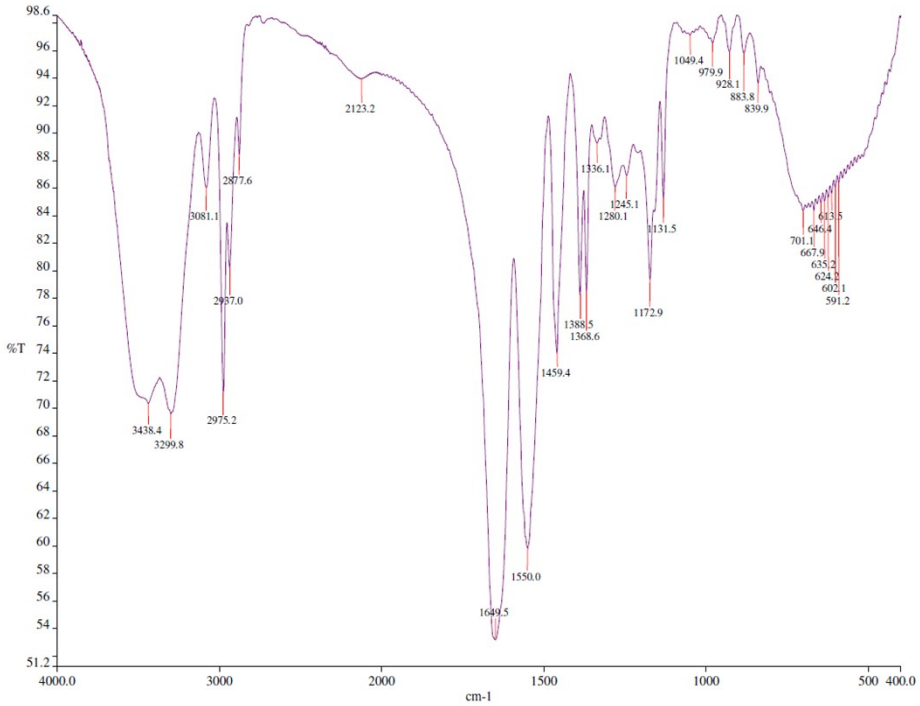


Figure S28. FTIR spectrum of **P6**.

REFERENCES

(1) Zhou, H.; Li, J.; Chua, M. H.; Yan, H.; Tang, B. Z.; Xu, J. *Polym. Chem*. **2014**, *5,* 5628.

(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.