Supporting Information for

Tryptophan Containing Covalently Cross-Linked Polymeric Gels with Fluorescence and pH-Induced Reversible Sol-Gel Transition Properties

Saswati Ghosh Roy, Kamal Bauri, Sunirmal Pal, and Priyadarsi De*

[a] Polymer Research Centre, Department of Chemical Sciences, Indian Institute of Science Education and Research – Kolkata, PO: BCKV, Mohanpur - 741252, Nadia, West Bengal, India

* Corresponding author: E-mail: p_de@iiserkol.ac.in (P. D.).

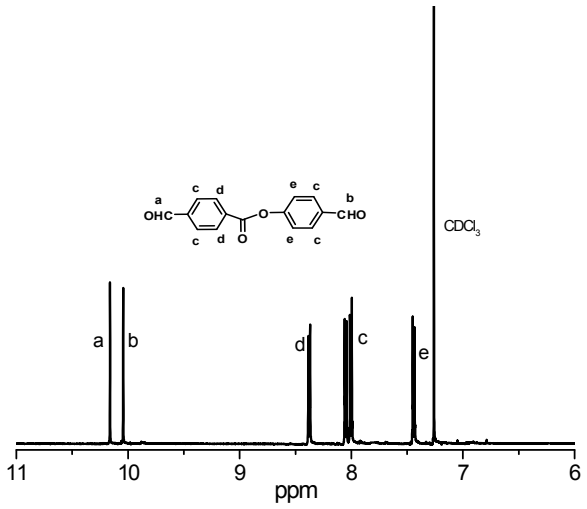

Fig. S1 ^{1}H NMR spectrum of 4-formylphenyl 4′-formylbenzoate in $CDCl_3$.

GPC Analysis. The system is equipped with Waters Model 515 HPLC pump and Waters Model 2414 refractive index detector, two HSPgel columns. Narrow molecular weight poly(methyl methacrylate) (PMMA) standards were used to generate the conventional calibration curve. The

P(Boc-Trp-HEMA-*co*-MEO_2MA) and P(Boc-Trp-HEMA-*co*-DMAEMA) copolymers were analyzed in THF and DMF, respectively. Measurements were done at 35 ^oC using 1.0 mL min^{-1} flow rate.

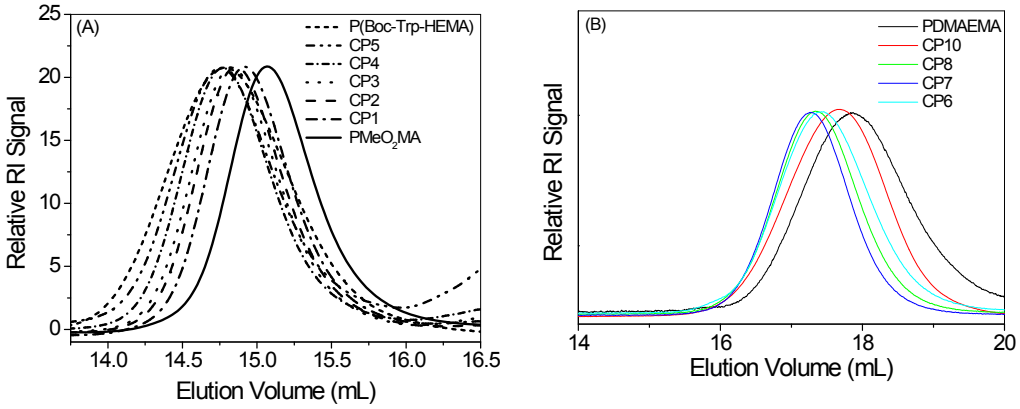

Fig. S2 The GPC RI traces of (A) P(Boc-Trp-HEMA-*co*-MEO_2MA) and (B) P(Boc-Trp-HEMA-*co*-DMAEMA) copolymers at different Boc-Trp-HEMA feed compositions.

Table S1 Solubility of P(Boc-Trp-HEMA-*co*-MEO_2MA) copolymers in various solvents.

Solvent	CP5	CP4	CP3	CP2	CP1
Water	×	×	×	×	×
Acetone	+	+	+	+	+
Methanol	+	+	+	+	+
Ethanol	×	×	×	×	×
DMF	+	+	+	+	+
DMSO	+	+	+	+	+
THF	+	+	+	+	+
Dioxane	+	+	+	+	+
Acetonitrile	+	+	+	+	+
DCM	+	+	+	+	+
Chloroform	+	+	+	+	+
Diethyl ether	×	×	×	×	×
Ethyl acetate	+	+	+	+	+
Toluene	×	×	×	×	×
Benzene	×	×	×	×	×
Hexane	×	×	×	×	×
Petether	×	×	×	×	×
CCl_4	×	×	×	×	×

Soluble: +, Insoluble: ×.

Table S2 Solubility of P(Boc-Trp-HEMA-*co*-DMAEMA) copolymers in various solvents.

Solvent	CP6	CP7	CP8	CP9	CP10
Water	×	×	×	×	×
Acetone	+	+	+	+	+
Methanol	+	+	+	+	+
Ethanol	+	+	+	+	+
DMF	+	+	+	+	+
DMSO	+	+	+	+	+
THF	+	+	+	+	+
Dioxane	+	+	+	+	+
Acetonitrile	+	+	+	+	+
DCM	+	+	+	+	+
Chloroform	+	+	+	+	+
Diethyl ether	×	×	×	×	×
Ethyl acetate	+	+	+	+	+
Toluene	×	×	×	×	×
Benzene	×	×	×	×	×
Hexane	×	×	×	×	×
Petether	×	×	×	×	×
CCl_4	×	×	×	×	×

Soluble: +, Insoluble: ×.

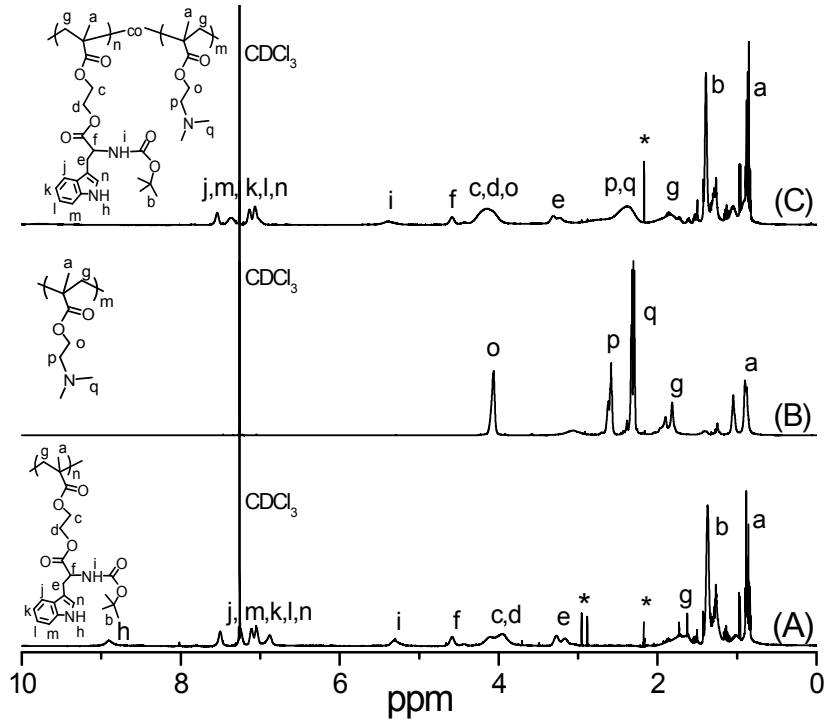

Fig. S3 ^{1}H NMR spectra in $CDCl_3$ of (A) Boc-Trp-HEMA, (B) PDMAEMA and (C) P(Boc-Trp-HEMA-*co*-PDMAEMA).

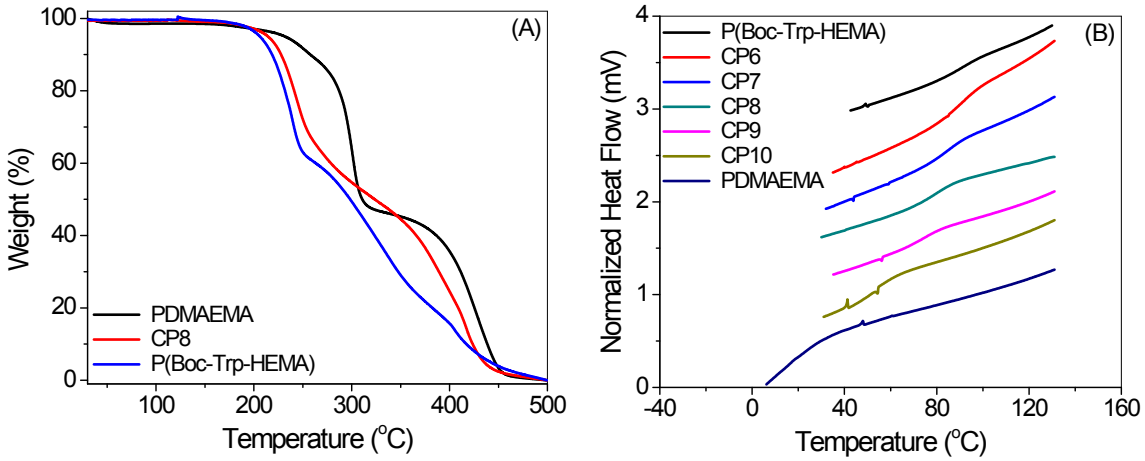

Fig. S4 (A) TGA thermogram of PDMAEMA, CP8 and P(Boc-Trp-HEMA) and, (B) DSC scans of P(Boc-Trp-HEMA), P(Boc-Trp-HEMA-*co*-DMAEMA) copolymers and PDMAEMA under nitrogen at a heating rate of 10 °C/min.

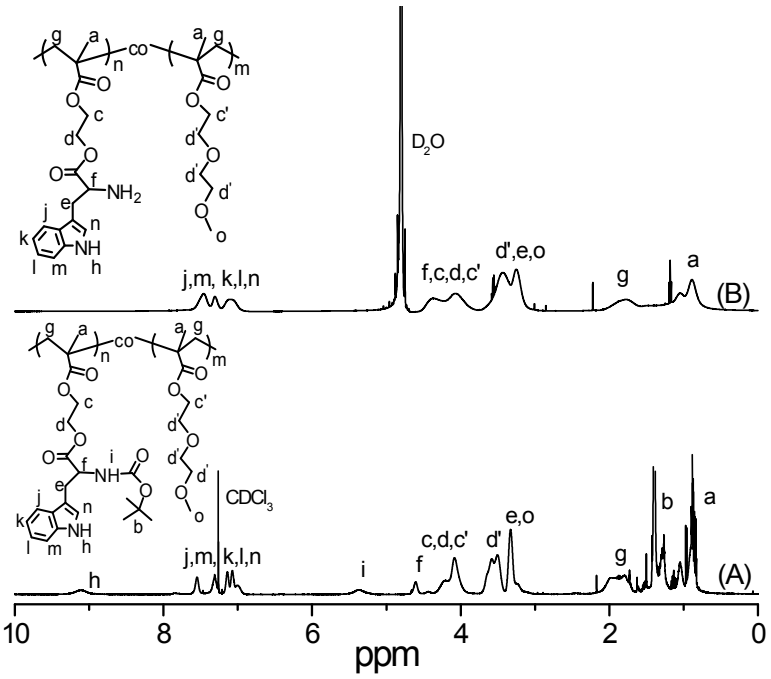

Fig. S5 ^{1}H NMR spectra of (A) P(Boc-Trp-HEMA-*co*-MEO_2MA) (CP3) in $CDCl_3$ and (B) P($^{+}H_3N$-Trp-HEMA-*co*-MEO_2MA) (DCP3) in D_2O.

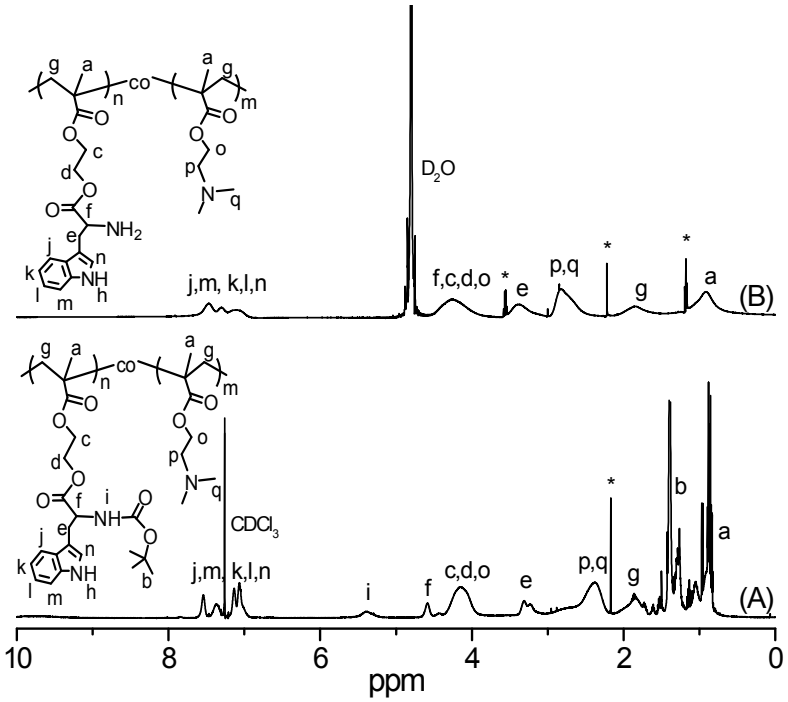

Fig. S6 ^{1}H NMR spectra of (A) P(Boc-Trp-HEMA-*co*-DMAEMA) (CP8) in $CDCl_3$ and (B) P($^{+}H_3N$-Trp-HEMA-*co*-DMAEMA) (DCP8) in D_2O.

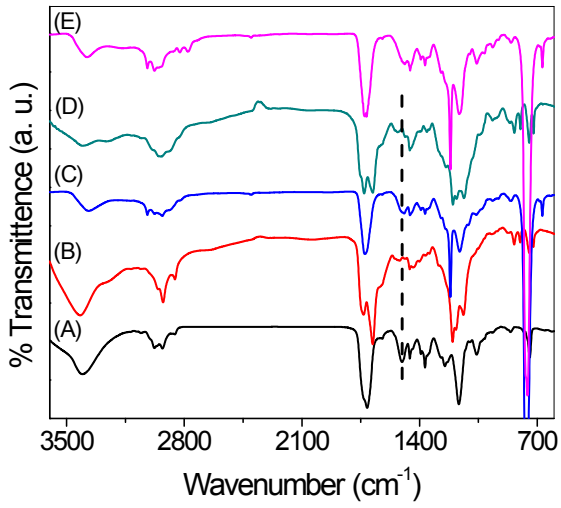

Fig. S7 FT-IR spectra of (A) P(Boc-Trp-HEMA), (B) P($^{+}H_3N$-Trp-HEMA), (C) P(Boc-Trp-HEMA-*co*-MEO_2MA) (CP3), (D) P($^{+}H_3N$-Trp-HEMA-*co*-MEO_2MA) (DCP3) and (E) $PMEO_2MA$.

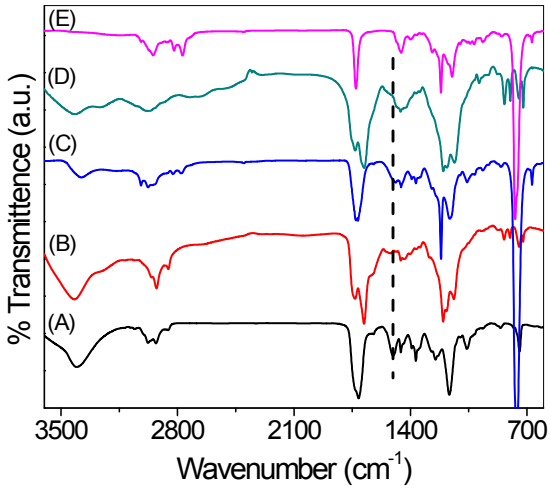

Fig. S8 FT-IR spectra of (A) P(Boc-Trp-HEMA), (B) P($^{+}H_3N$-Trp-HEMA), (C) P(Boc-Trp-HEMA-*co*-DMAEMA) (CP8), (D) P($^{+}H_3N$-Trp-HEMA-*co*-DMAEMA) (DCP8) and (E) PDMAEMA.

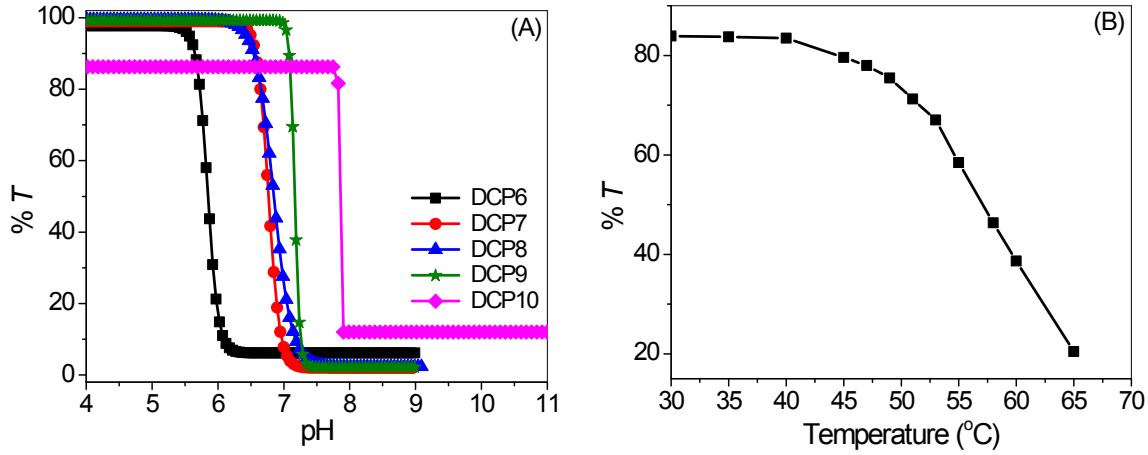

Fig. S9 Plots of percentage transmittance (%*T*) versus (A) pH at 25.0 °C for the P(H_3N^{+}-Trp-HEMA-*co*-MEO_2MA) copolymers and (B) temperature at pH 6.5 for DCP10 in aqueous medium (0.2 wt %).

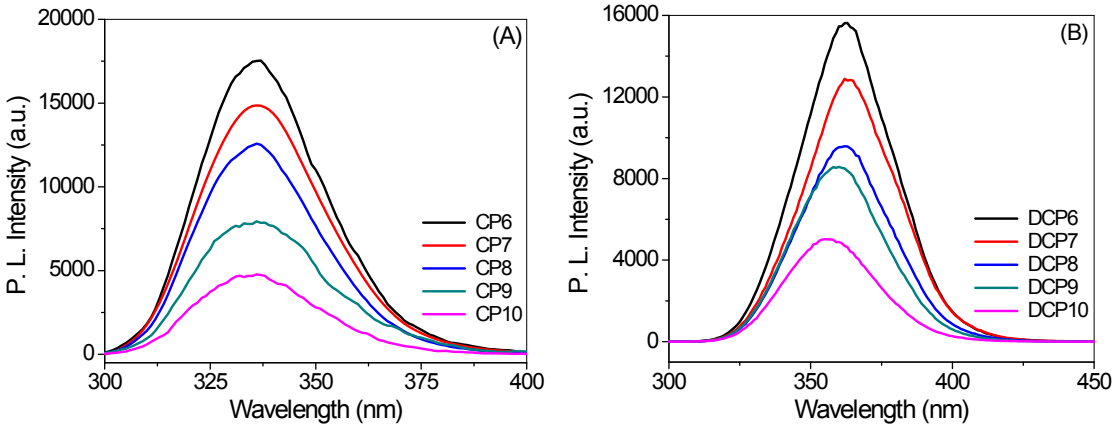

Fig. S10 The photoluminescence (PL) emission spectra at 25 °C of (A) P(Boc-Trp-HEMA-*co*-DMAEMA) in THF and (B) P(H_2N^+-Trp-HEMA-*co*-DMAEMA) in aqueous media. Polymer solutions (0.05 mg/mL) were excited at 275 nm.

Table S3 Solubility of P(^+H_3N-Trp-HEMA-*co*-MEO_2MA) copolymers in various solvents.

Solvent	DCP5	DCP4	DCP3	DCP2	DCP1
Water	+	+	+	+	+
Acetone	+	+	+	+	+
Methanol	+	+	+	+	+
Ethanol	+	+	+	+	+
DMF	+	+	+	+	+
DMSO	+	+	+	+	+
THF	+	+	+	+	+
Dioxane	+	+	+	+	+
Acetonitrile	+	+	+	+	+
DCM	×	×	×	×	+
Chloroform	×	×	×	×	×
Diethyl ether	×	×	×	×	×
Ethyl acetate	×	×	×	×	+
Toluene	×	×	×	×	×
Benzene	×	×	×	×	×
Hexane	×	×	×	×	×
Petether	×	×	×	×	×
CCl_4	×	×	×	×	×

Soluble: +, Insoluble: ×.

Table S4 Solubility of P($^{+}H_3N$-Trp-HEMA-*co*-DMAEMA) copolymers in various solvents.

Solvent	DCP6	DCP7	DCP8	DCP9	DCP10
Water	+	+	+	+	+
Acetone	+	+	+	+	+
Methanol	+	+	+	+	+
Ethanol	+	+	+	+	+
DMF	+	+	+	+	+
DMSO	+	+	+	+	+
THF	+	+	+	+	+
Dioxane	+	+	+	+	+
Acetonitrile	+	+	+	+	+
DCM	×	×	×	×	+
Chloroform	×	×	×	×	×
Diethyl ether	×	×	×	×	×
Ethyl acetate	×	×	×	×	+
Toluene	×	×	×	×	×
Benzene	×	×	×	×	×
Hexane	×	×	×	×	×
Petether	×	×	×	×	×
CCl_4	×	×	×	×	×

Soluble: +, Insoluble: ×.

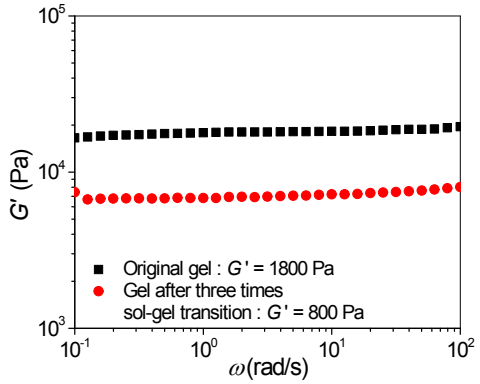

Fig. S11 Storage modulus G' value of P(H_2N-Trp-HEMA) versus frequency of homopolymer dynamic gels with CHO/NH_2 = 1 ratios of original gel and gel after sol-gel transition of three times.