Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Interactions of ionic liquids with hydration layer of poly(N-isopropylacrylamide): Comprehensive analysis of biophysical techniques results

P. Madhusudhana Reddy, R. Umapathi and P. Venkatesu*

Department of Chemistry, University of Delhi, Delhi-110 007, India

*Author to whom correspondence should be addressed; E-mail: venkatesup@hotmail.com; venkatesu@chemistry.du.ac.in (P. Venkatesu)

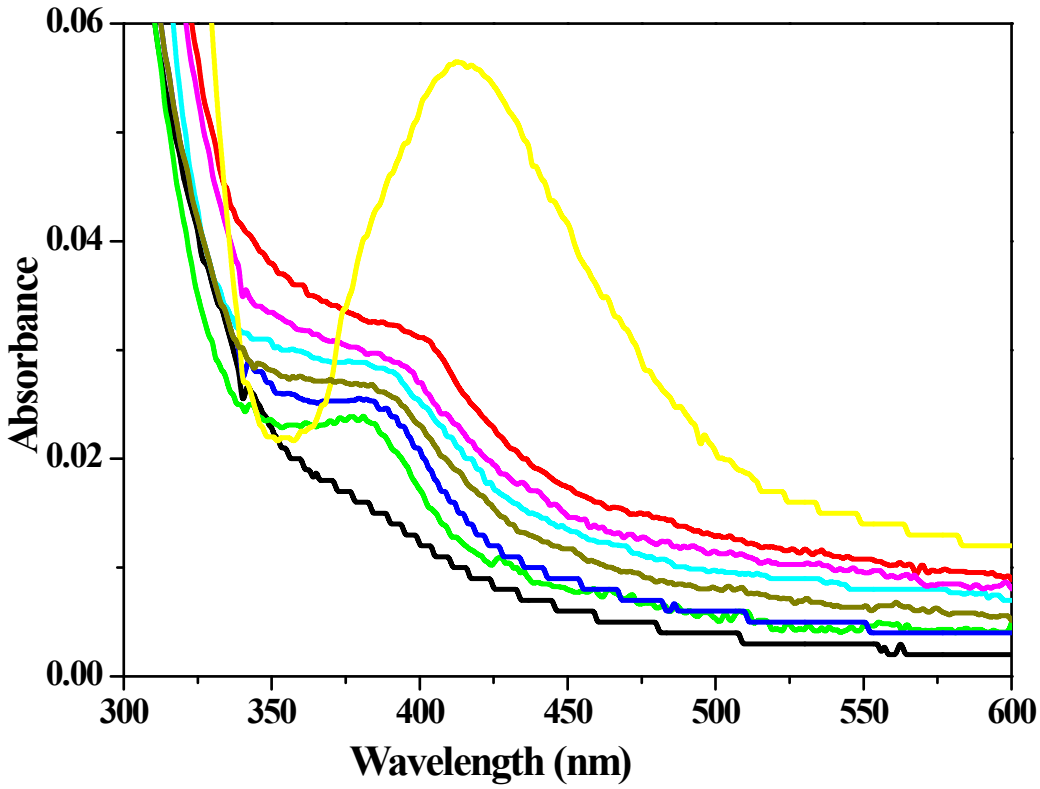

Fig. S1 UV-visible absorbance spectra of ANS in PNIPAM aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration of IL is 10 mg/mL.

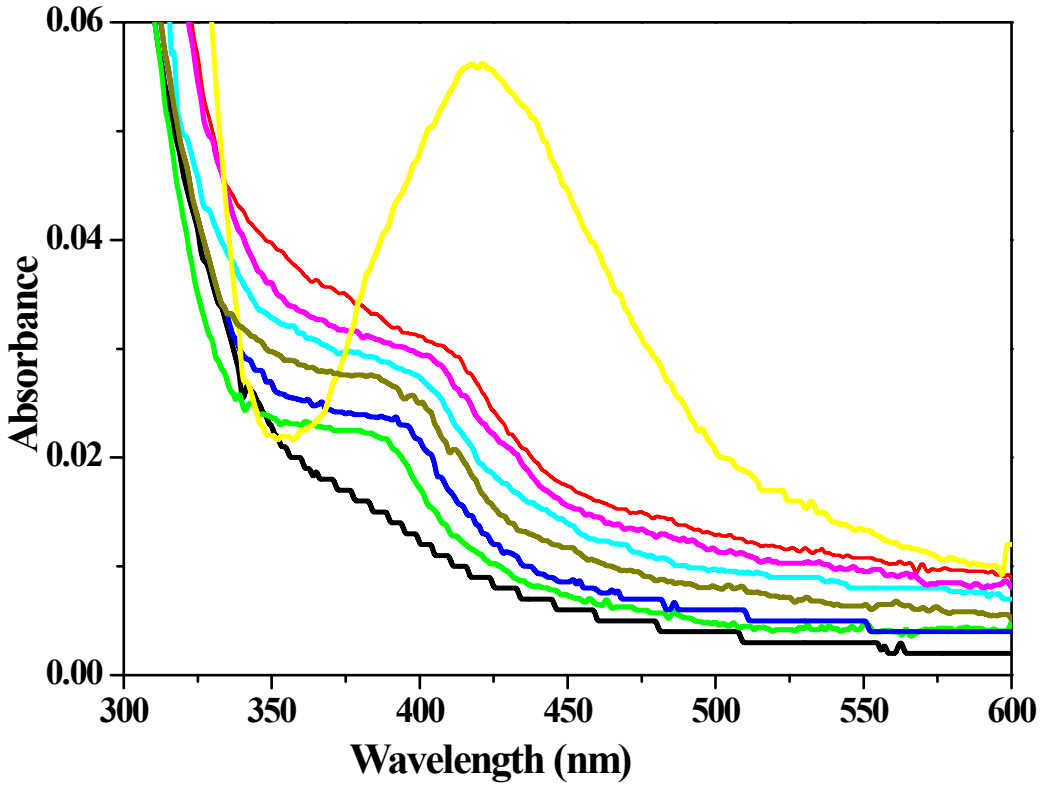

Fig. S2 UV-visible absorbance spectra of ANS in PNIPAM aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration of IL is 15 mg/mL.

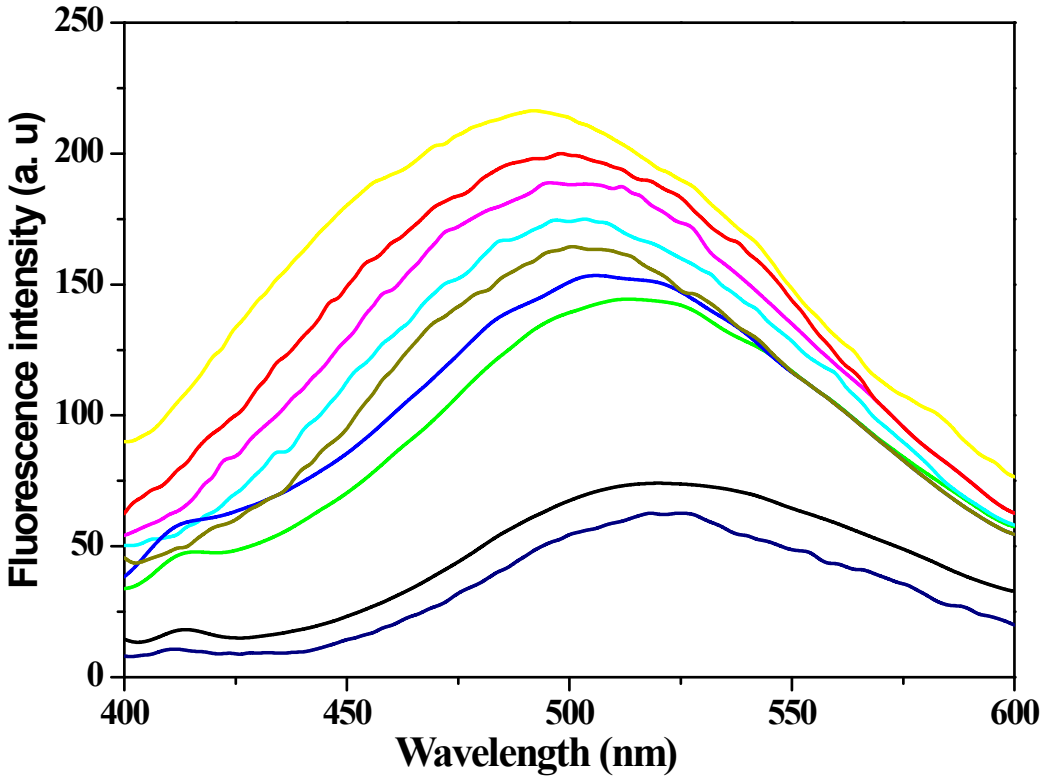

Fig. S3 Fluorescence emission spectra of ANS in PNIPAM aqueous solution without and with ILs;{pure ANS (navy blue line), IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration of IL is 10 mg/mL.

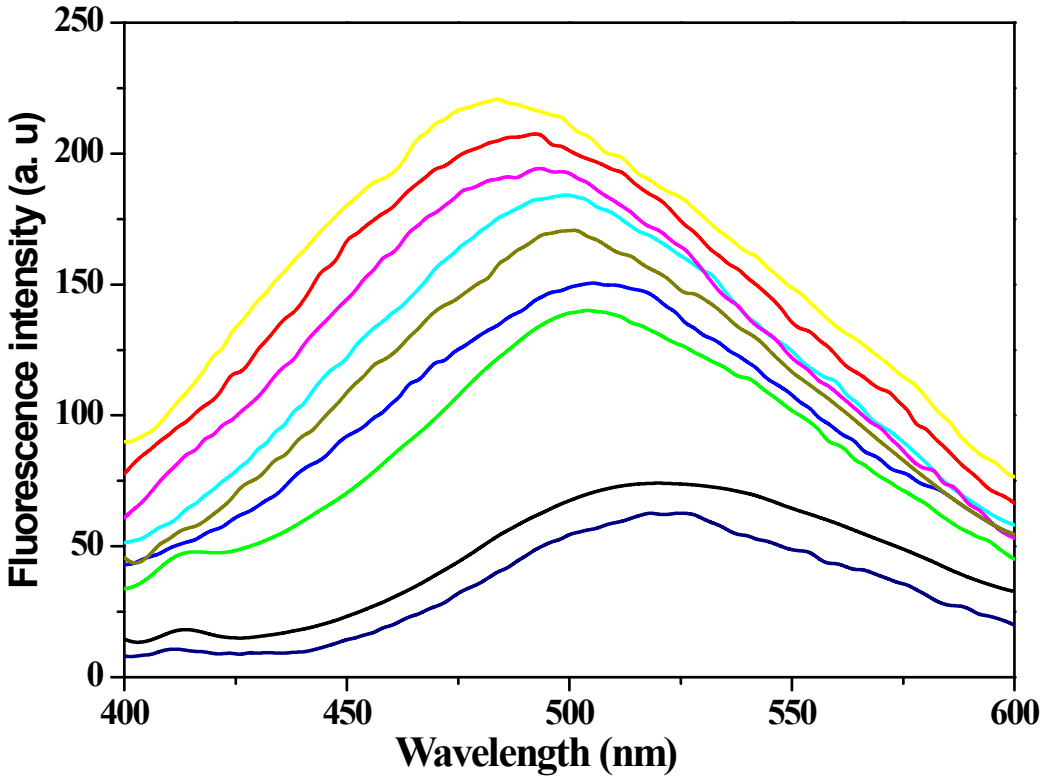

Fig. S4 Fluorescence emission spectra of ANS in PNIPAM aqueous solution without and with ILs;{pure ANS (navy blue line), IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration of IL is 15 mg/mL.

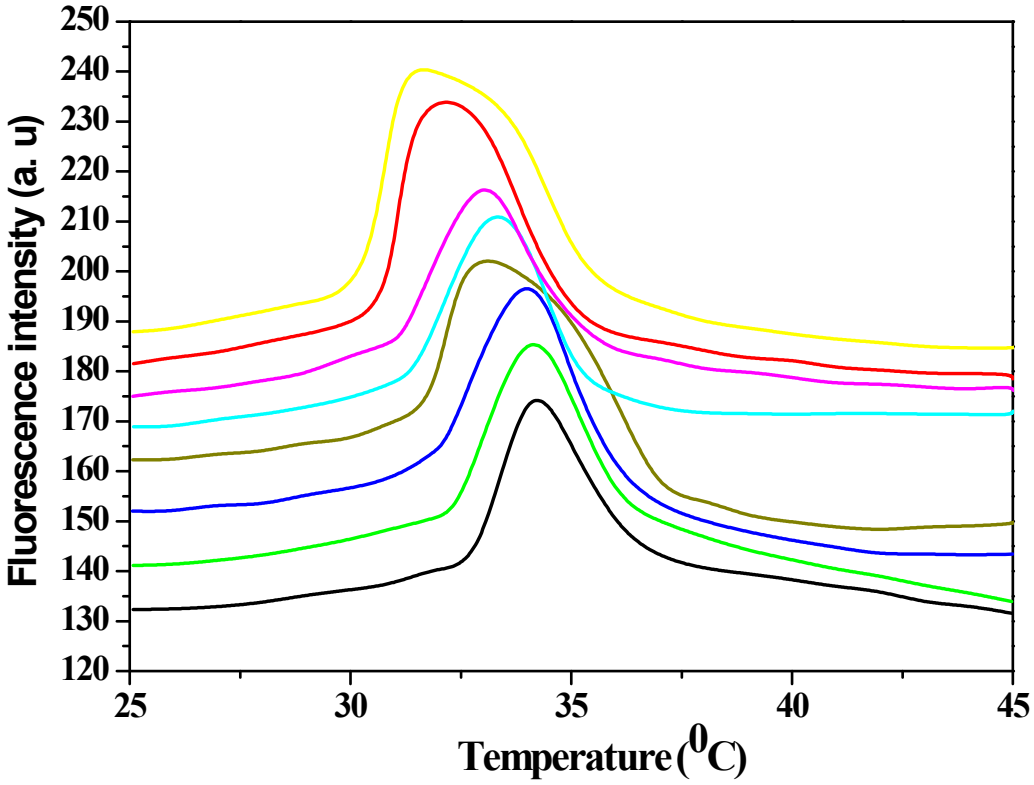

Fig. S5 Fluorescence emission spectra of ANS in PNIPAM aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 10 mg/mL.

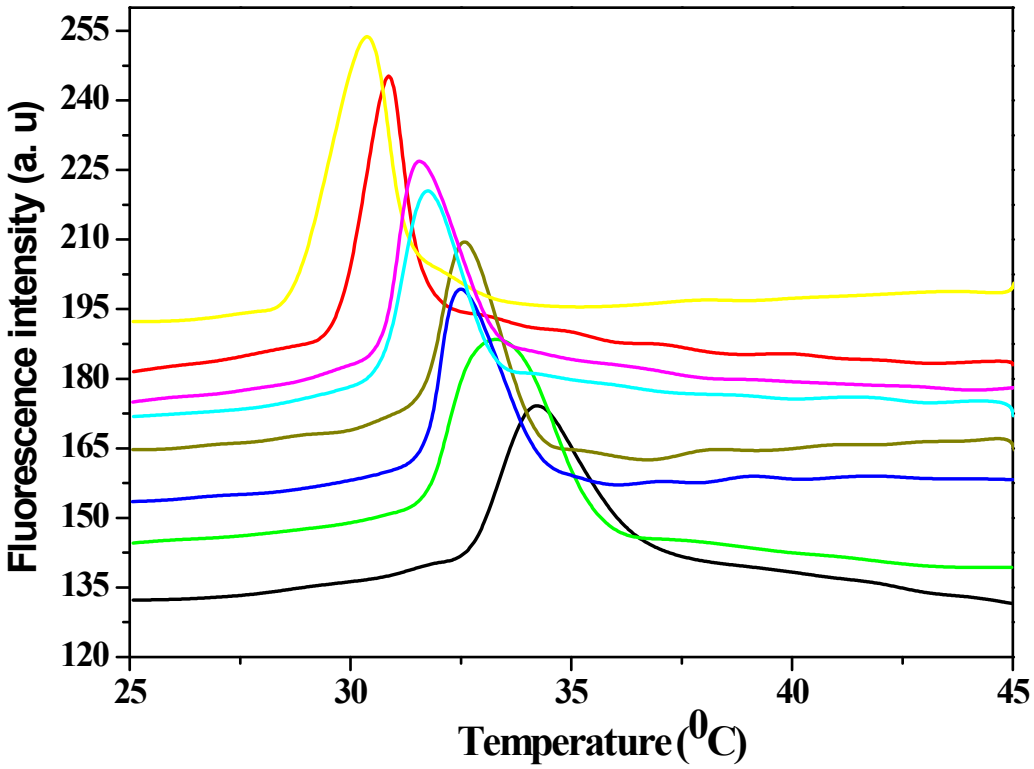

Fig. S6 Fluorescence emission spectra of ANS in PNIPAM aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 15 mg/mL.

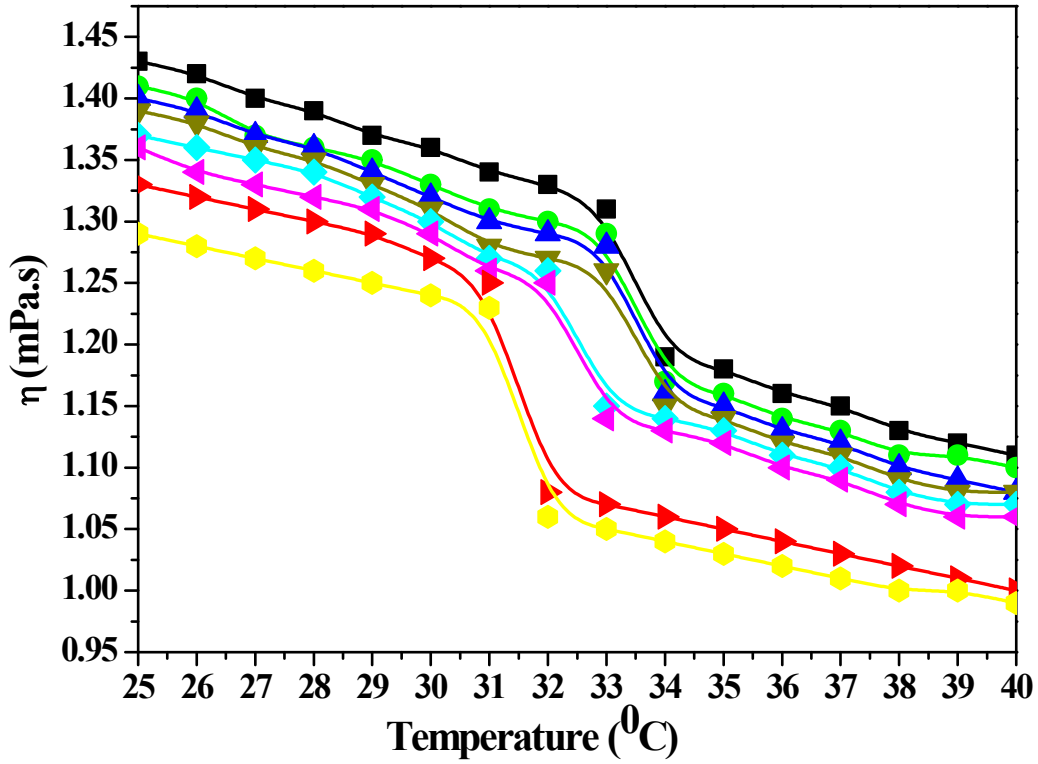

Fig. S7 Viscosity of the PNIPAM aqueous solution without and with ILs;{IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 10 mg/mL.

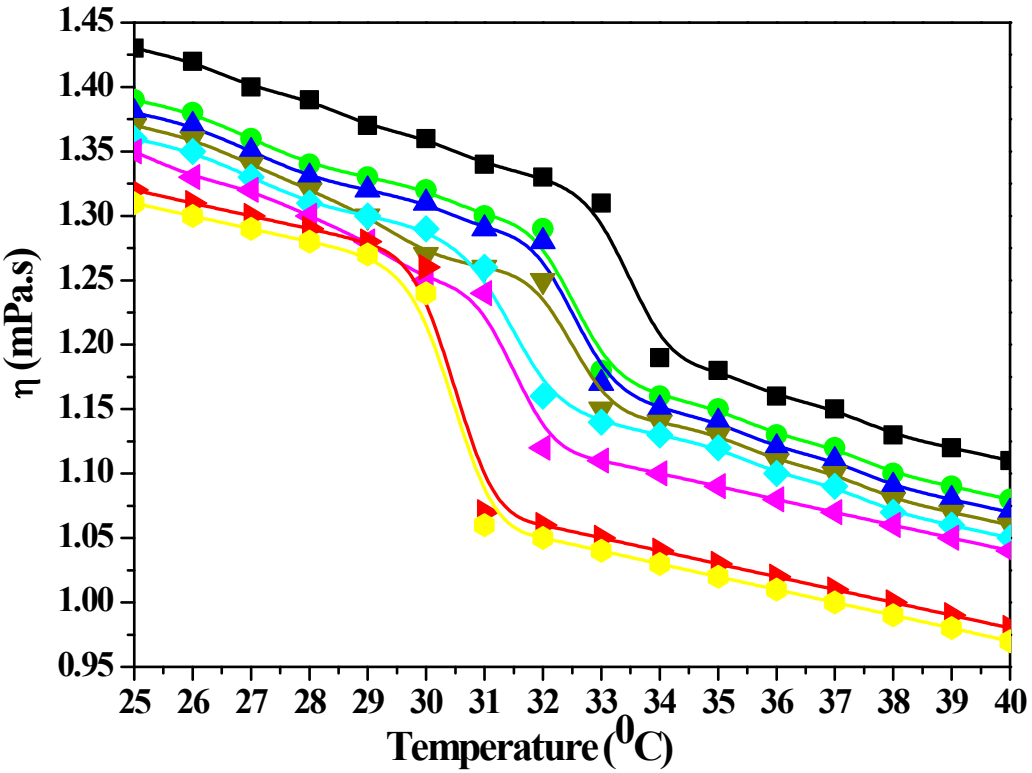

Fig. S8 Viscosity of the PNIPAM aqueous solution without and with ILs;{IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 15 mg/mL.

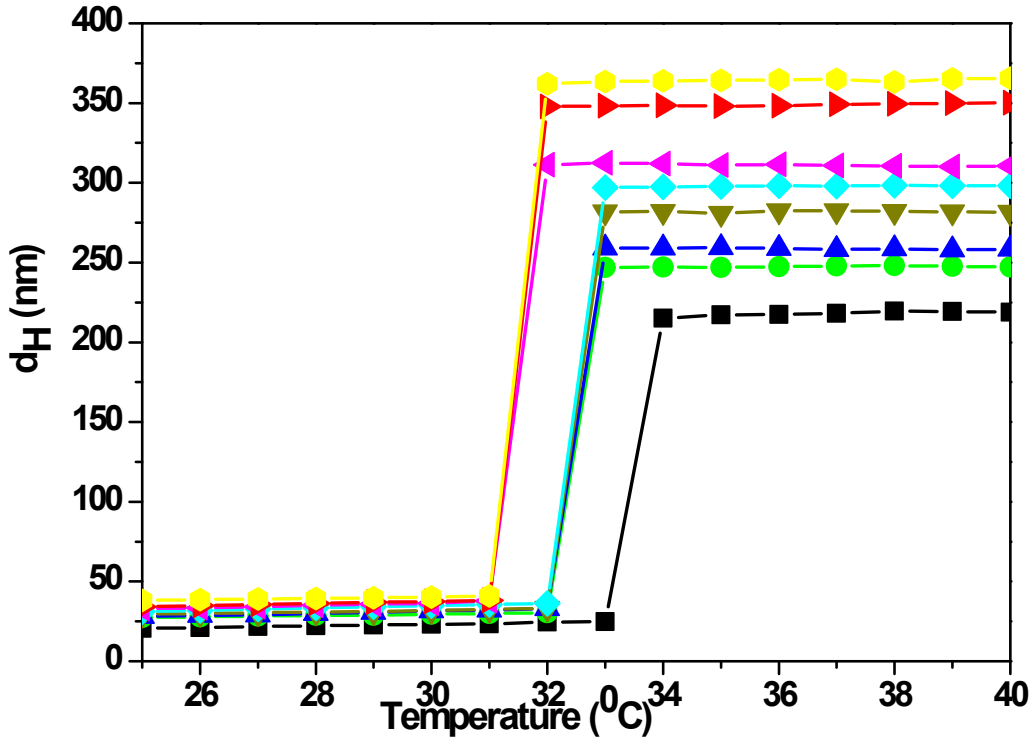

Fig. S9 Hydrodynamic diameter, d_H, of PNIPAM in the absence and presence of ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 10 mg/mL.

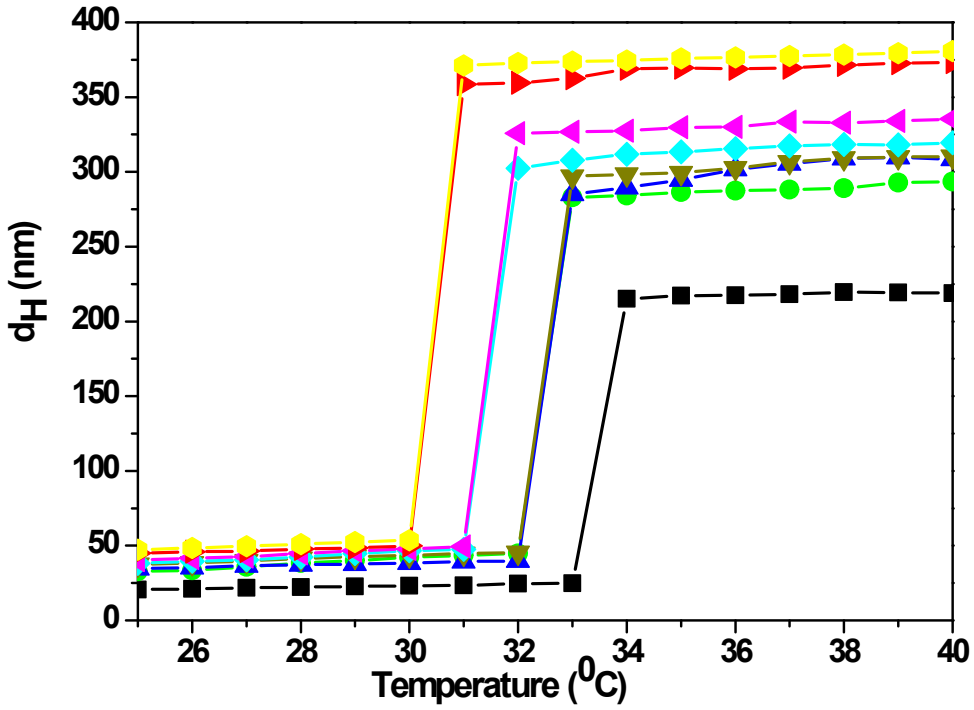

Fig. S10 Hydrodynamic diameter, d_H, of PNIPAM in the absence and presence of ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 15 mg/mL.

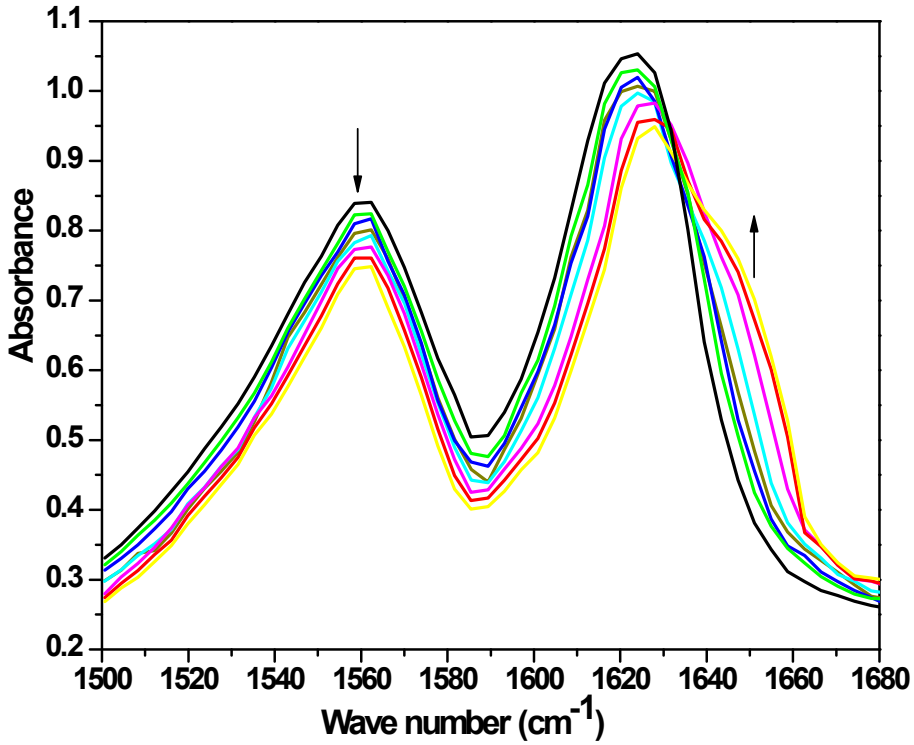

Fig. S11 FTIR spectra of PNIPAM aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow colour line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red colour line) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration IL is 10 mg/mL.

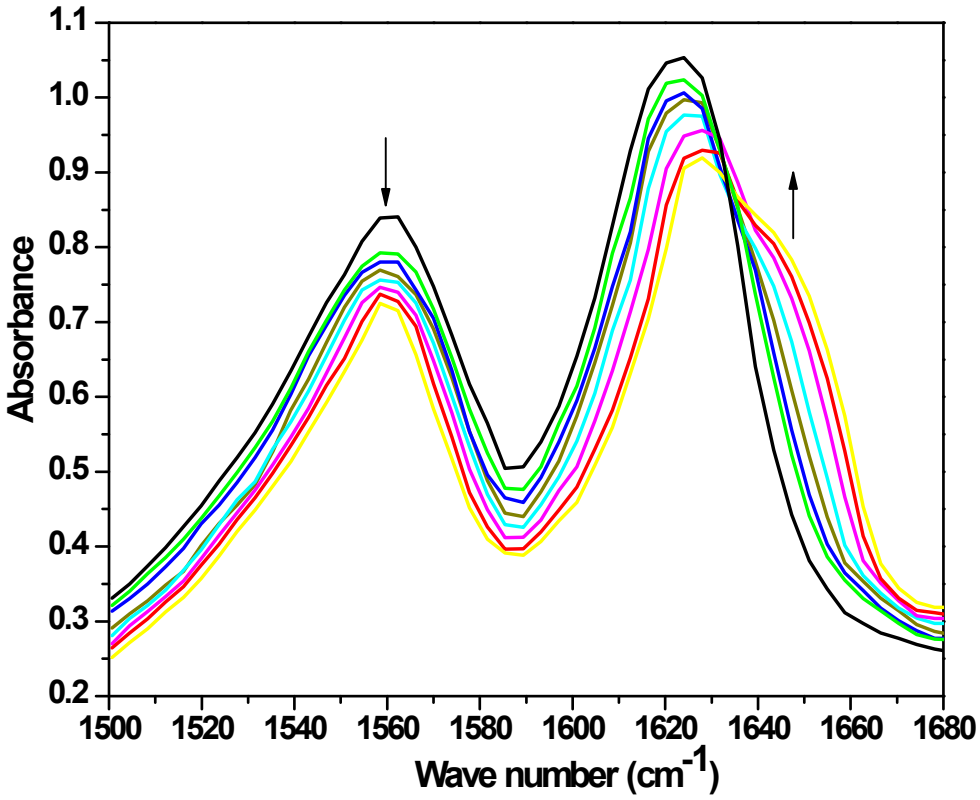

Fig. S12 FTIR spectra of of PNIPAM aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow colour line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red colour line) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration IL is 15 mg/mL.

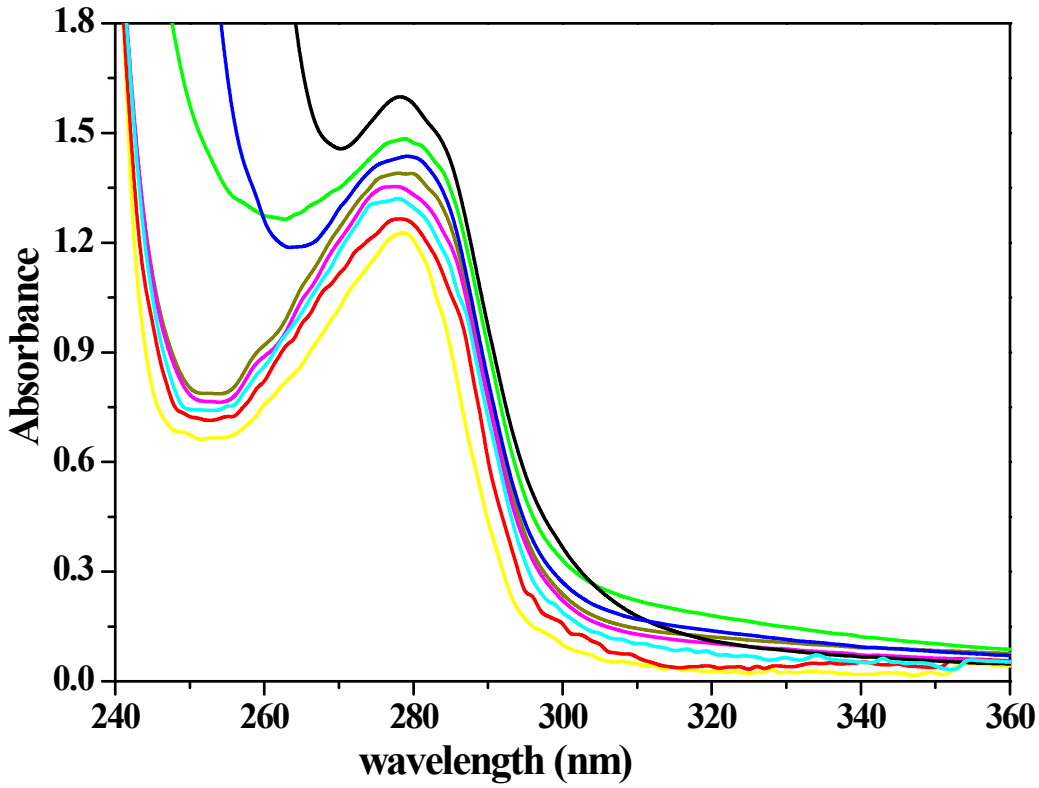

Fig. S13 UV-visible absorbance spectra of tryptophan of BSA in the aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration of IL is 10 mg/mL.

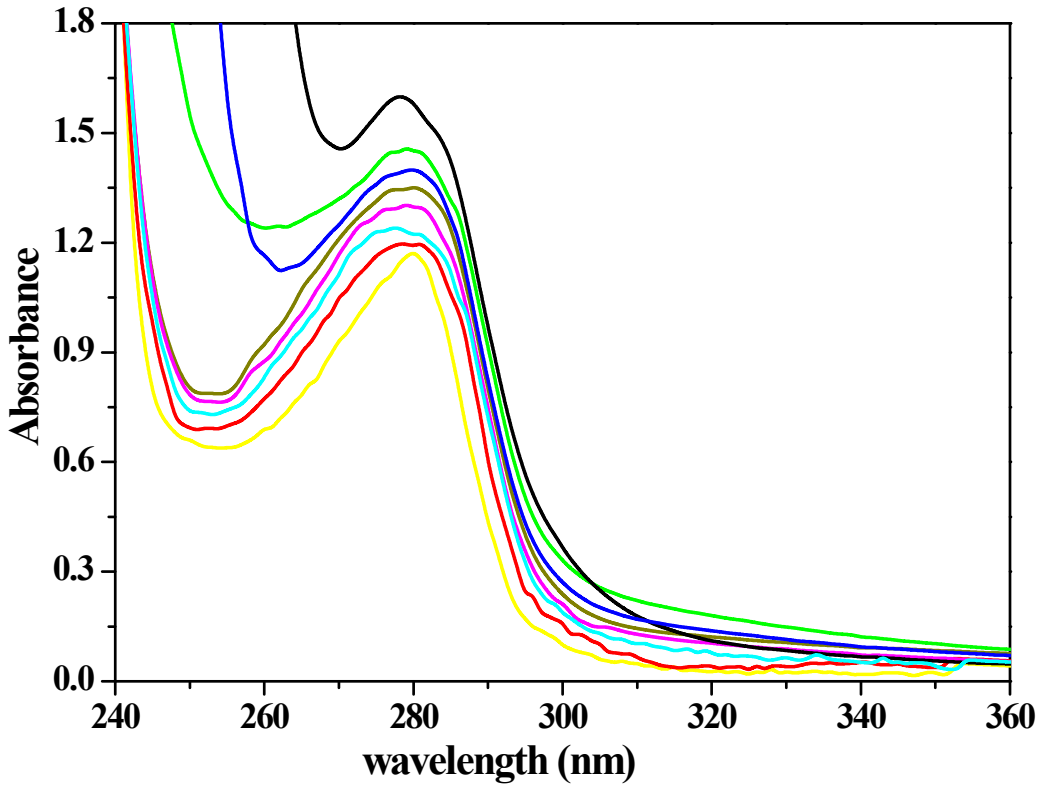

Fig. S14 UV-visible absorbance spectra of tryptophan of BSA in the aqueous solution without and with ILs; {IL free (black colour line), SCN^- (green colour line), BF_4^- (blue colour line), I^- (dark yellow line), Br^- (cyan colour line), Cl^- (magenta colour line), CH_3COO^- (red line colour) and HSO_4^- (yellow colour line)} at 25 ^{0}C. Concentration of IL is 15 mg/mL.

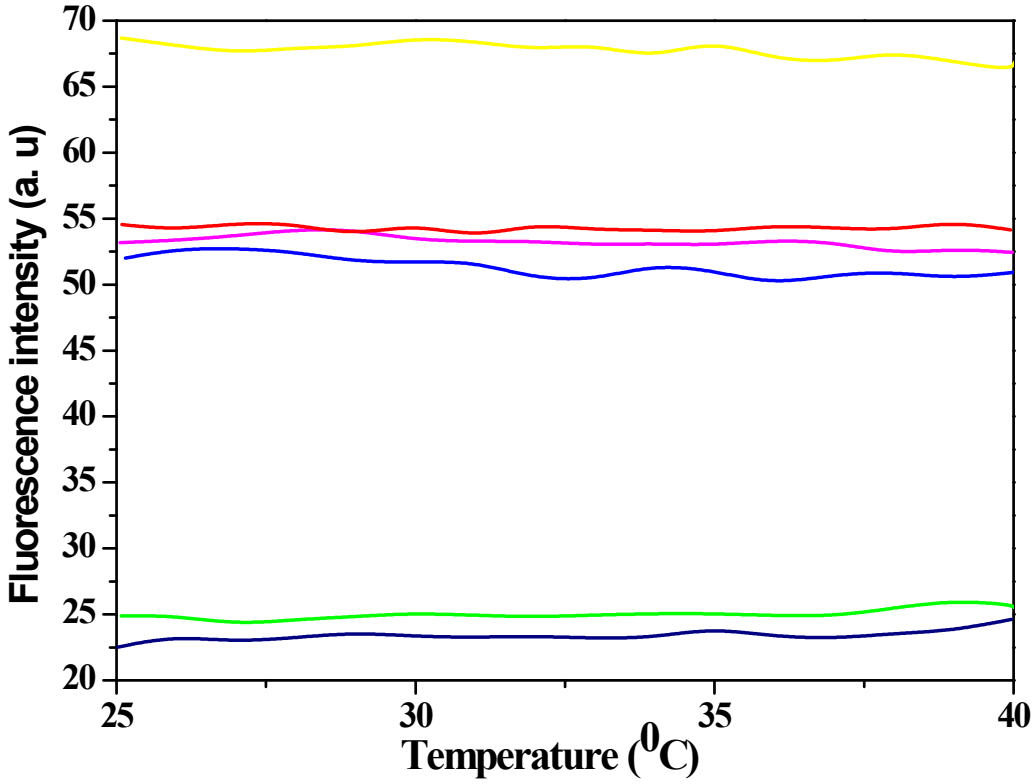

Fig. S15 Fluorescence emission spectra of ANS in aqueous solution without and with ILs;{IL free (navy colour line), SCN^- (green colour line), BF_4^- (blue colour line), Cl^- (magenta colour line), CH_3COO^- (red colour line) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 40 ^{0}C. Concentration of IL is 15 mg/mL.

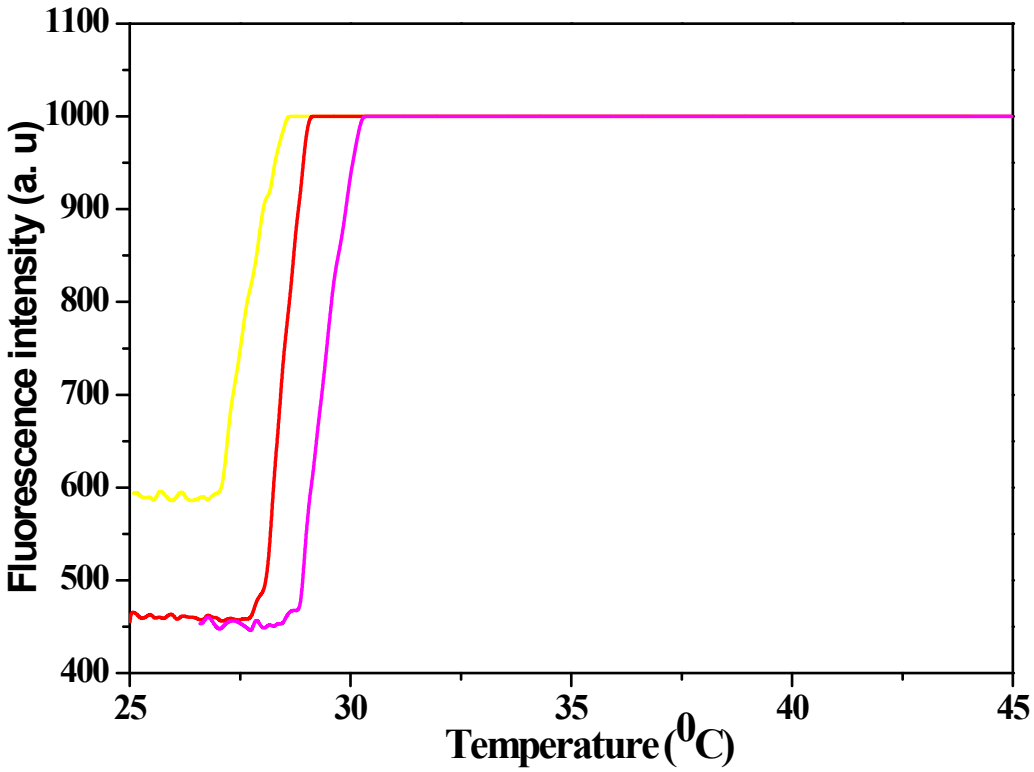

Fig. S16 Fluorescence emission spectra of ANS in aqueous solution with ILs containing kosmotrope anions;{Cl^- (magenta colour line), CH_3COO^- (red colour line) and HSO_4^- (yellow colour line)} in the temperature range of 25 – 45 ^{0}C. Concentration of IL is 70 mg/mL.