Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supporting Information

Fig. S1: ^{1}H NMR spectra of various concentrations of SDS in the presence of copolymer P2800 (fixed at 0.2 wt%), showing (a) 3.11, (b) 3.88, (c) 4.66, (d) 5.82, (e) 9.70, (f) 13.58, (g) 21.34, (h) 29.10, (i) 40.74 and (j) 79.54 mM of SDS.

Fig. S2: ^{1}H Chemical shift (δ) of SDS α-CH_2 against SDS concentration at 25°C for SDS/D_2O (●) and SDS/P2800 (0.2 wt%)/D_2O (ξ).

Fig. S3: SDS free fraction (p_f) as a function of SDS concentration using equation 3 of reference 31, for SDS/P2800 (0.2 wt%)/D_2O system at 25°C.

Fig. S4: Variable-concentration proton spin-lattice relaxation rate (R_1) data of PPO-CH_3, PEO-CH_2, α-CH_2 of SDS/P2800 (0.2 wt%)/D_2O at 25°C.

Fig. S5: ^{1}H NMR spectra of various temperatures for SDS(97 mM)/P2800 (10 wt%)/D_2O, showing (a) 25°C, (b) 28°C, (c) 32°C, (d) 36°C, (e) 40°C, (f) 44°C, (g) 48°C, (h) 52°C, (i) 56°C and (j) 60°C.

Fig. S6: ^{1}H chemical shift data of (A) EO methylene and (B) PO methyl groups against temperature, for SDS (97 mM)/P2800 (10 wt%)/D_2O system.

Fig. S7: ^{13}C chemical shift data of (A) EO methylene and (B) PO methyl groups against temperature, for SDS (97 mM)/P2800 (10 wt%)/D_2O system.

Fig. S8: Activation energies obtained from variable temperature ^{1}H R_1 data of (A) PO methyl group and (B) SDS methyl, for SDS (97 mM)/P2800 (10 wt%)/D_2O system. The solid line represents the best Arrhenius fit of the experimental data.

Table S1 Viscosity data for SDS/P2800 (0.2 wt%)/H_2O as a function of SDS at 25°C.

Table S2 Proton spin-lattice relaxation rates (R_1) (in s^{-1}) of SDS in the absence and presence of the polymer P2800 (fixed at 0.2 wt%) (at 25°C).

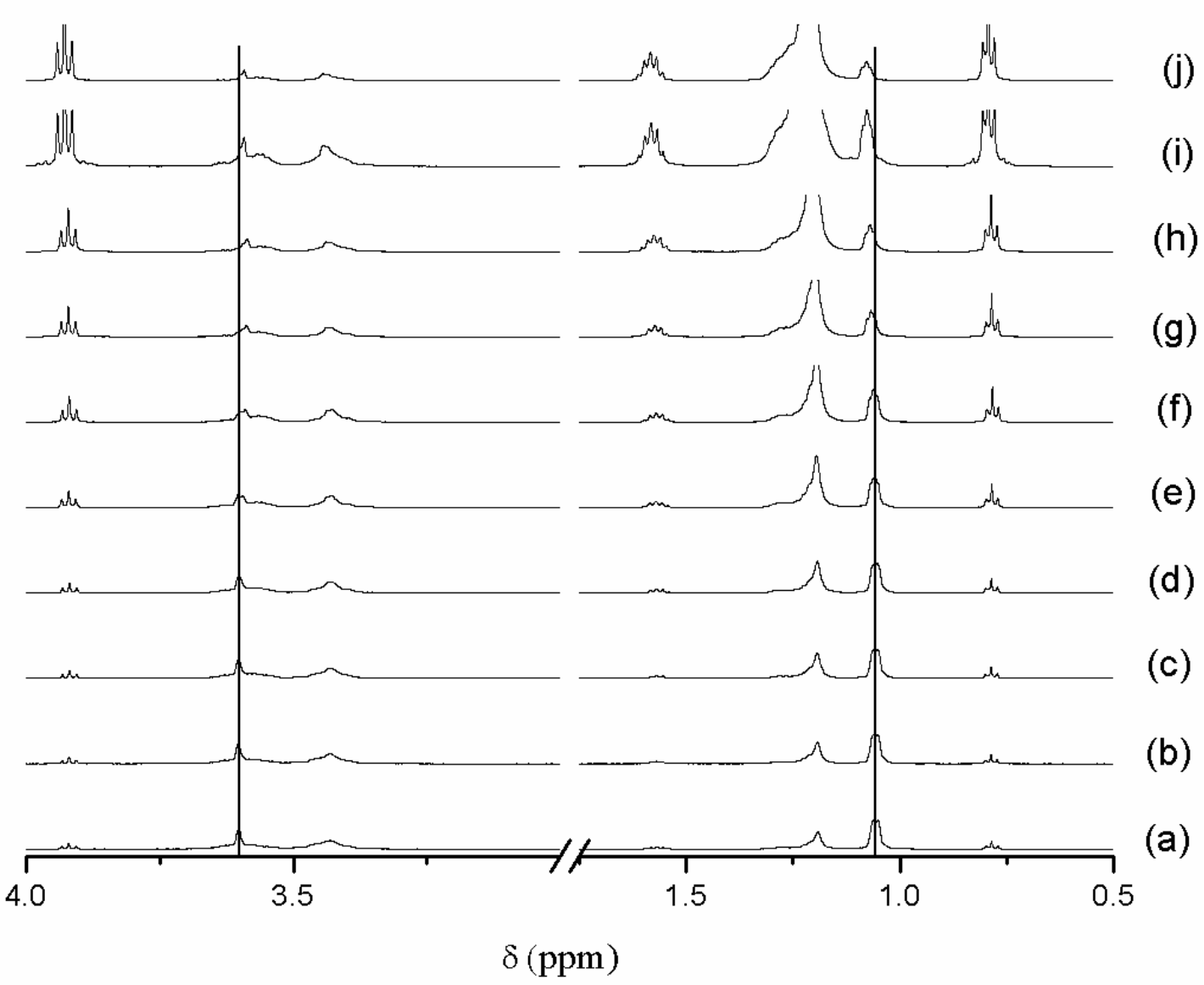

Fig. S1

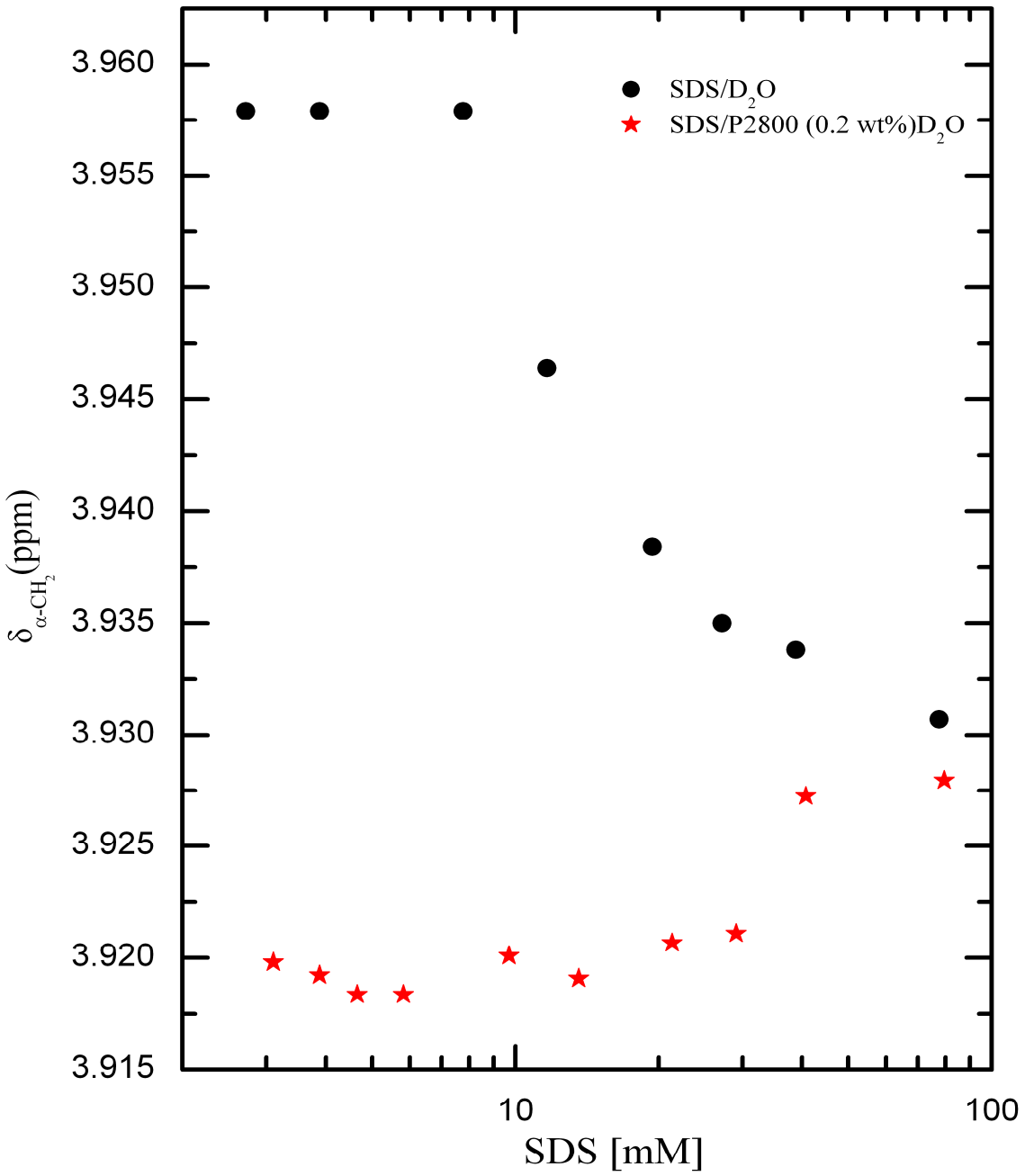
3.960
3.955
3.950
3.945
3.940
3.935
3.930
3.925
3.920
3.915
$\delta_{\alpha\text{-}CH_2}$ (ppm)
10
100
SDS [mM]
SDS/D$_2$O
SDS/P2800 (0.2 wt%)D$_2$O

Fig. S2

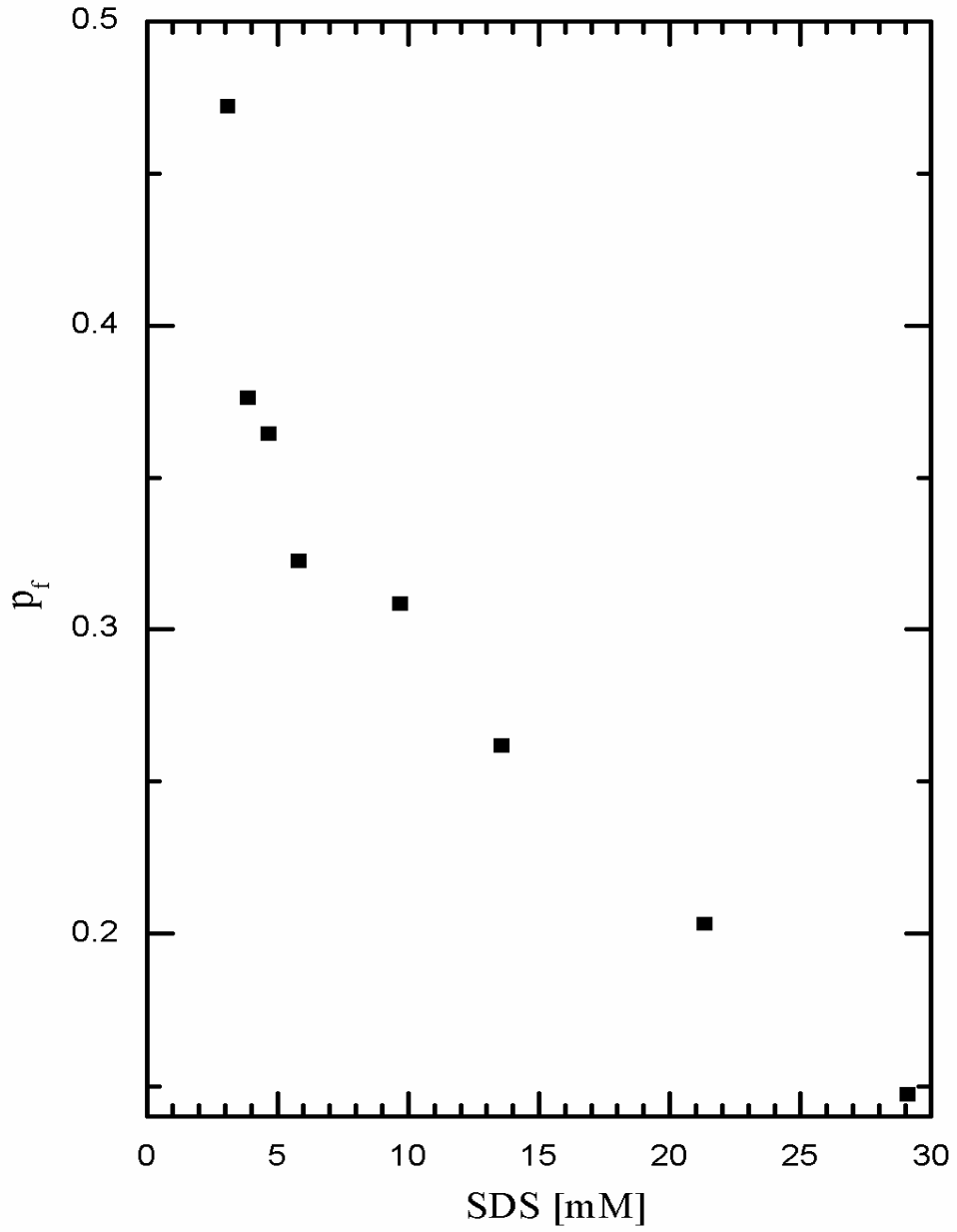

Fig. S3

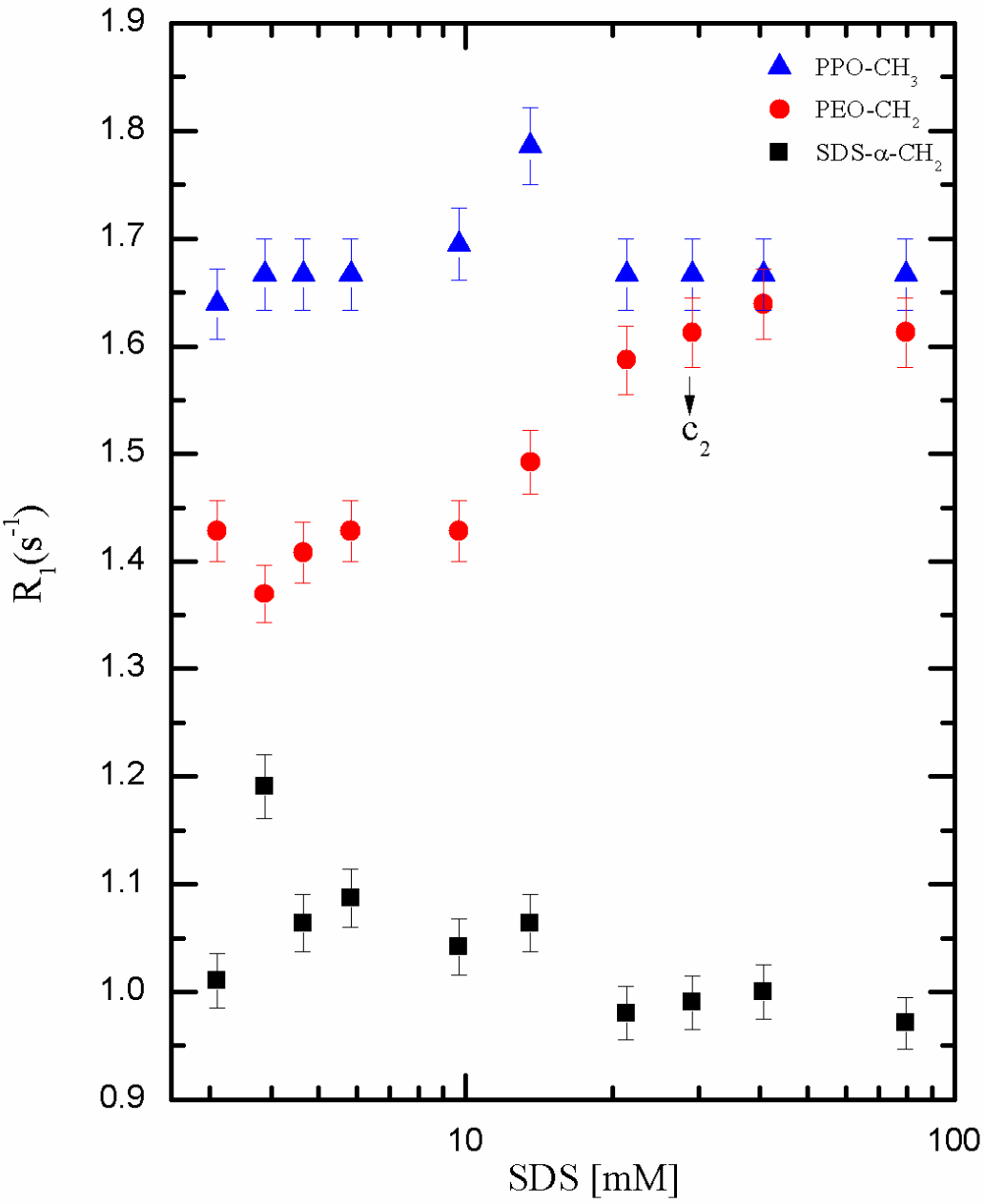
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
$R_1(s^{-1})$
10
100
SDS [mM]
PPO-CH$_3$
PEO-CH$_2$
SDS-α-CH$_2$
c_2

Fig. S4

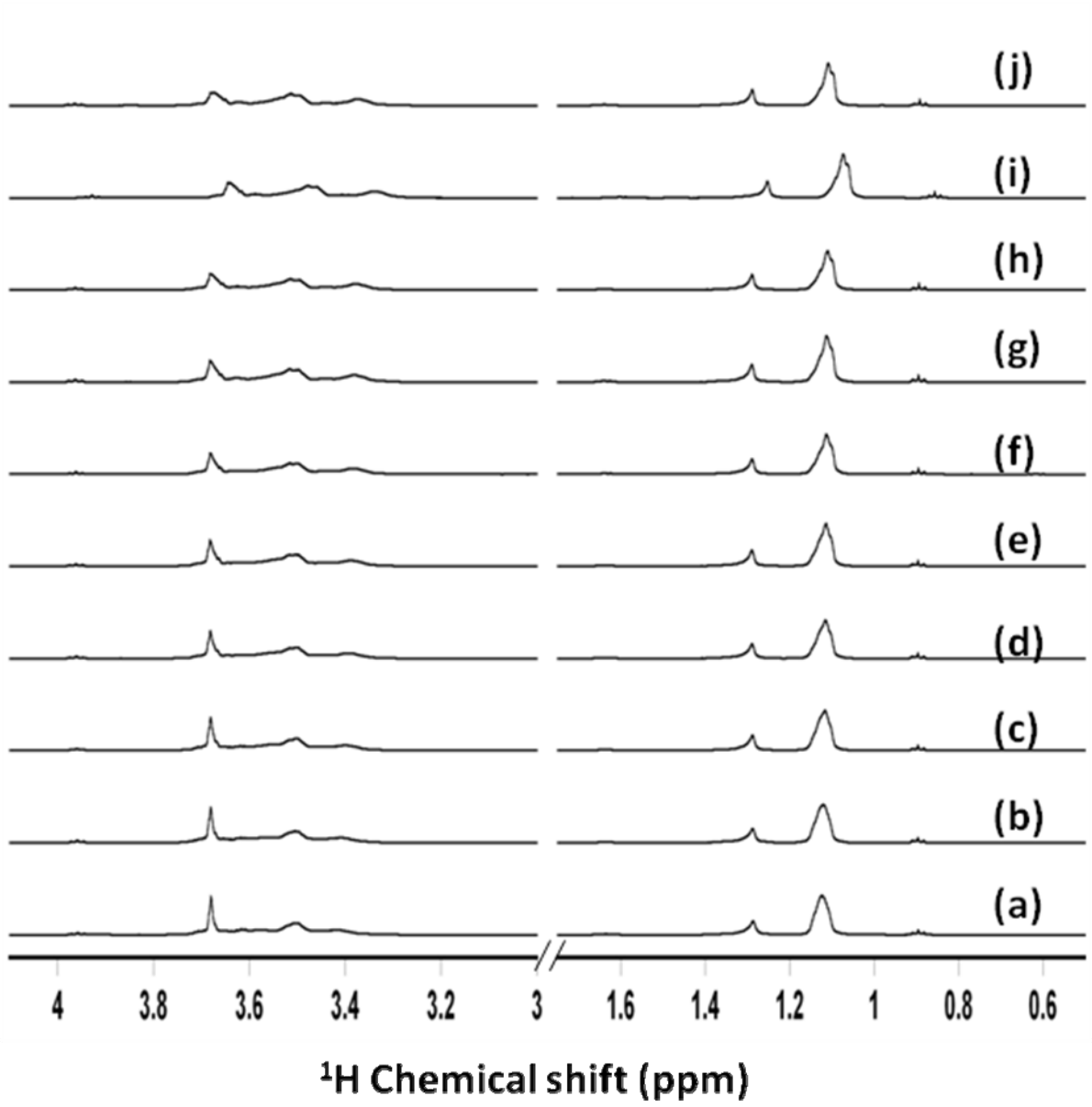

Fig. S5

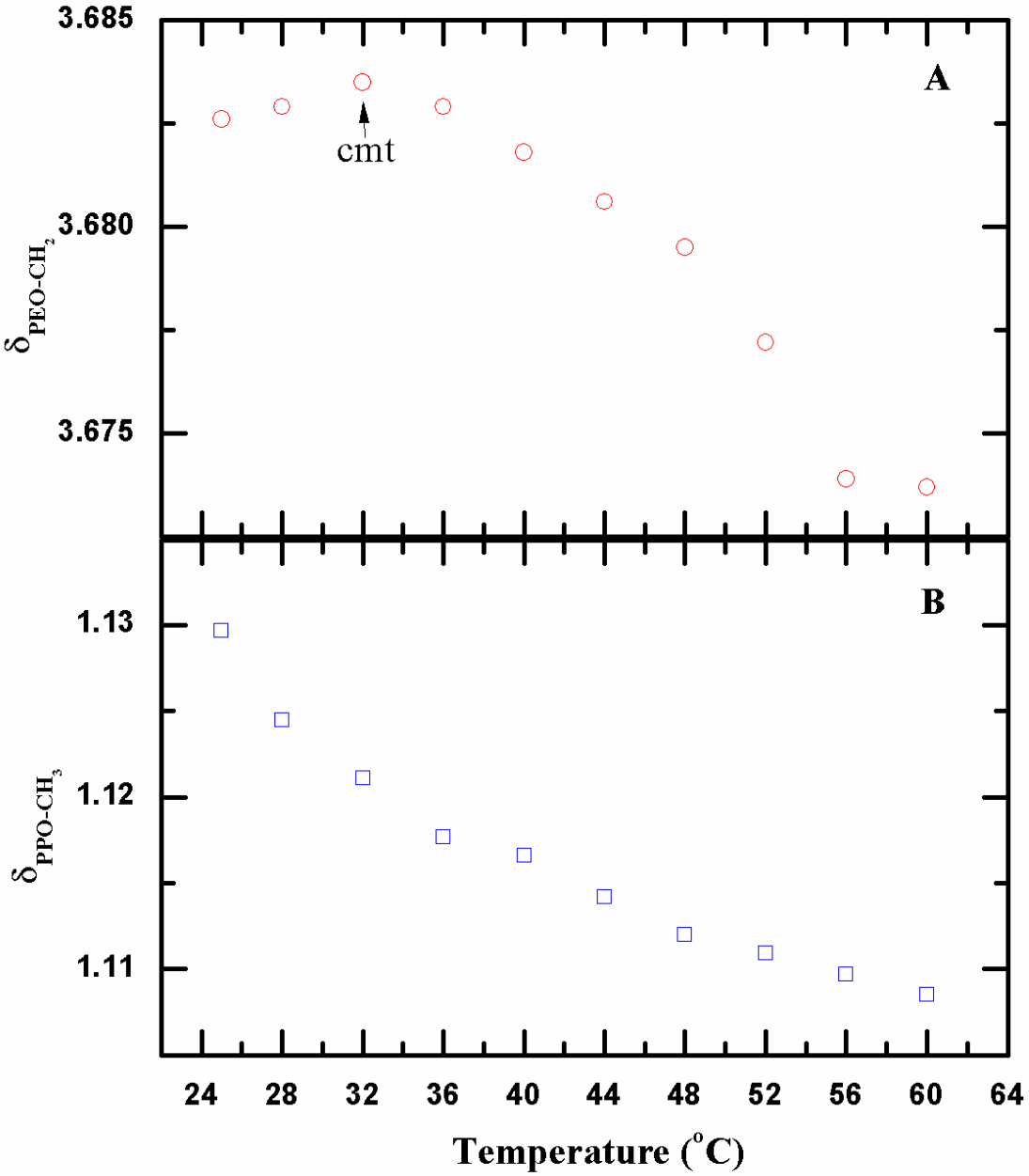
3.685
3.680
3.675
A
cmt
δ_{PEO-CH_2}
1.13
1.12
1.11
B
δ_{PPO-CH_3}
24
28
32
36
40
44
48
52
56
60
64
Temperature (^{o}C)

Fig. S6

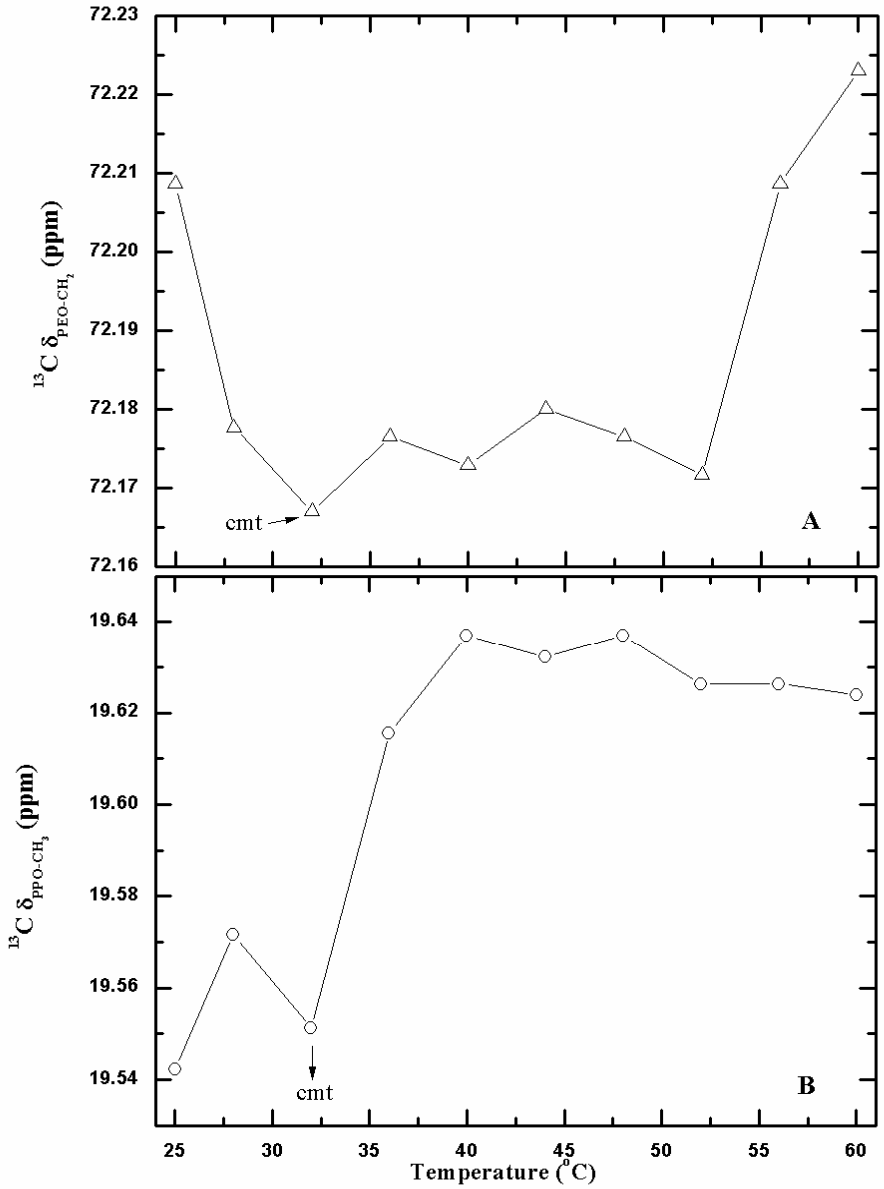
72.23
72.22
72.21
72.20
72.19
72.18
72.17
72.16
$^{13}C\ \delta_{PEO-CH_2}$ (ppm)
cmt
A
19.64
19.62
19.60
19.58
19.56
19.54
$^{13}C\ \delta_{PPO-CH_3}$ (ppm)
cmt
B
25
30
35
40
45
50
55
60
Temperature (^{o}C)

Fig. S7

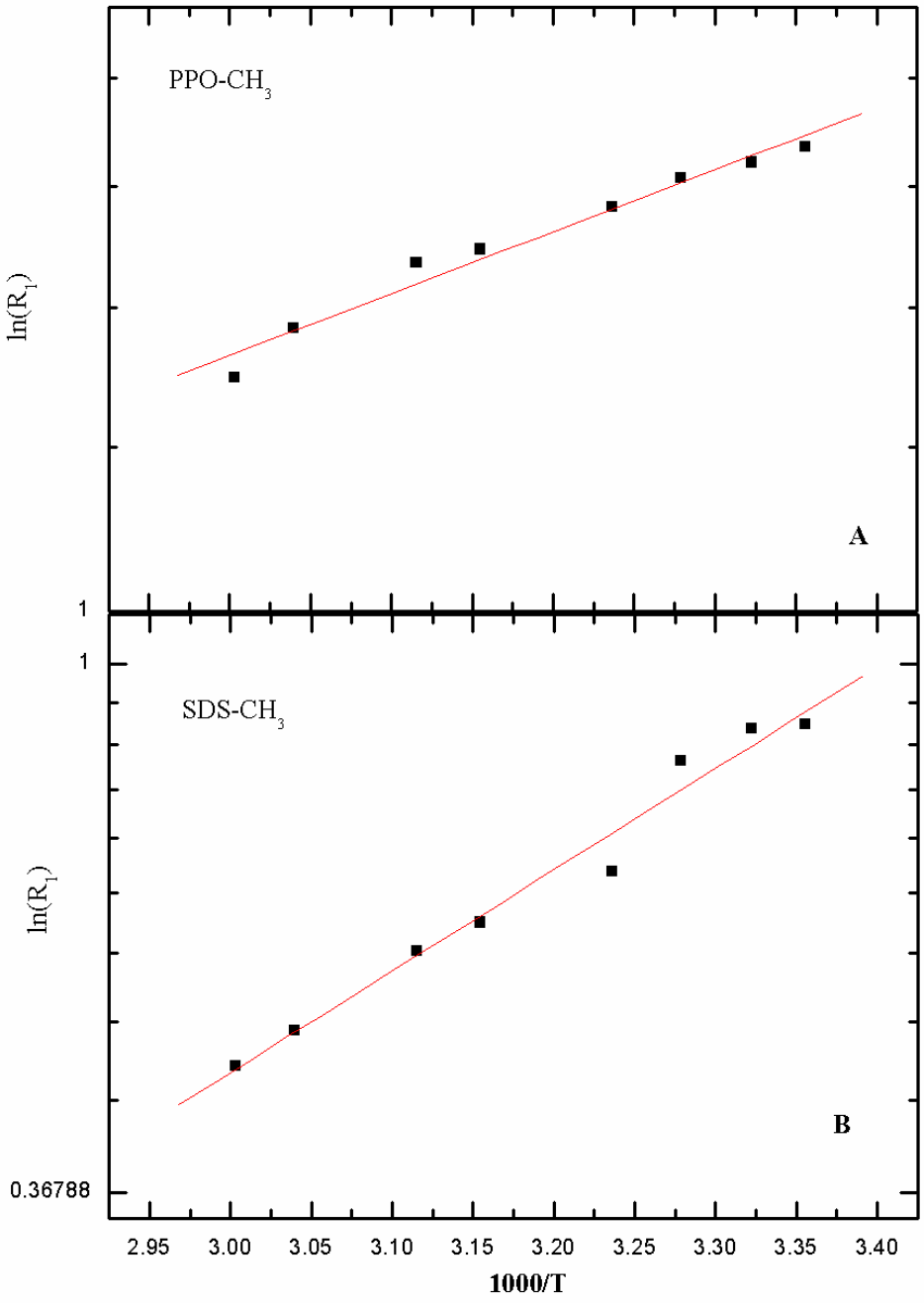
PPO-CH3
ln(R1)
A
1
1
SDS-CH3
ln(R1)
B
0.36788
2.95
3.00
3.05
3.10
3.15
3.20
3.25
3.30
3.35
3.40
1000/T

Fig. S8

Table S1 Viscosity[†] data for SDS/P2800 (0.2 wt%)/H_2O as a function of SDS at 25°C.

SDS (mM)	Viscosity at 25°C in H_2O (cPs^{-1})
2.776	1.069
3.47	0.962
4.164	0.961
5.205	0.975
8.675	0.972
12.145	0.98
19.085	0.967
26.025	1.004
36.435	1.063
71.135	1.168

[†] The viscosity data is collected using VISCOlab 3000 (Cambridge Viscosity) in CLRI, Chennai.

Table S2 Proton spin-lattice relaxation rates (R_1) (in s^{-1}) of SDS in the absence and presence of the polymer P2800 (fixed at 0.2 wt%) (at 25°C).

[SDS] (mM)	Pure SDS (α -CH_2)	SDS + Polymer (α -CH_2)	Pure SDS (β-CH_2)	SDS + Polymer (β-CH_2)	Pure SDS $(CH_2)_n$	SDS + Polymer $(CH_2)_n$	Pure SDS (CH_3)	SDS + Polymer (CH_3)
3.88	0.68	1.16	0.87	1.45	0.81	1.27	0.35	0.73
11.64	0.82	1.15	1.01	1.39	0.96	1.28	0.50	0.65
38.8	0.91	1.04	1.24	1.32	1.15	1.24	0.65	0.65
77.6	0.89	0.98	1.14	1.24	1.12	1.25	0.63	0.73