

Aqueous Systems of Surface Active Ionic Liquid Having Aromatic Anion: Phase Behavior, Exfoliation of Graphene Flakes and Its Hydrogelation

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Supporting Information

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Annexure S1

Synthetic procedure for the preparation of [C₁₆mim][PTS]

Equal molar amount of [C₁₆mim][Cl] and the sodium p-toluenesulfonate were mixed in butanol and stirred at 25 °C overnight. The reaction mixture was filtered to remove NaCl, formed during the reaction. Butanol was removed by rotary evaporation. Obtained residue was washed with diethyl ether to remove the residual butanol, if any. Obtained SAIL was dried for 24 hours under vacuum and characterized by using ¹H NMR.

¹H NMR Data

¹H NMR (500 MHz, 10% D₂O and 90% H₂O, δ-ppm) 0.84 (t, 3H, -CH₃), 1.09-1.25 (m, 26H, (-CH₂)₁₃), 1.49 (q, 2H, N⁺-CH₂-CH₂-), 2.19 (s, 3H, -CH₃), 3.76 (s, 3H, N-CH₃), 3.88 (t, 2H, N⁺-CH₂-CH₂-), 7.07 (d, 2H, benzene), 7.27 (s, 1H, N-CH-CH-N⁺), 7.32 (s, 1H, N-CH-CH-N⁺), 7.60 (d, 2H, benzene), 8.64 (s, 1H, N-CH-N⁺).

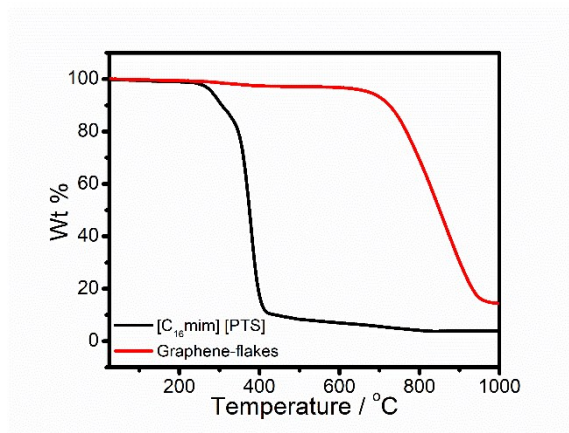


Figure S1: TGA of exfoliated graphene-flakes after separation from the dispersion and SAIL [C₁₆mim][PTS]. (No peak corresponding to SAIL in the plot of graphene-flakes suggest the recovery of graphene-flakes without any contamination)

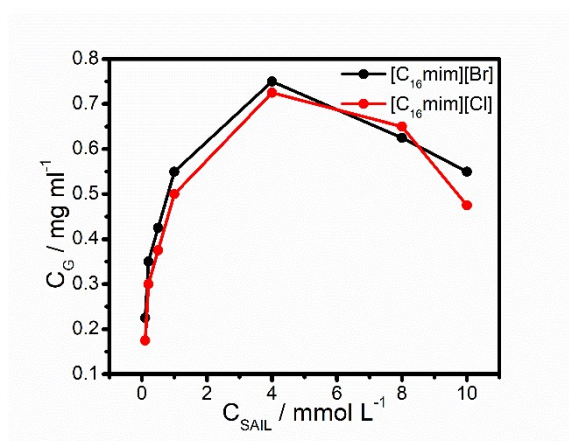


Figure S2: Concentration of exfoliated graphene-flakes (C_G) as a function of concentration of SAIL (C_{SAIL}).

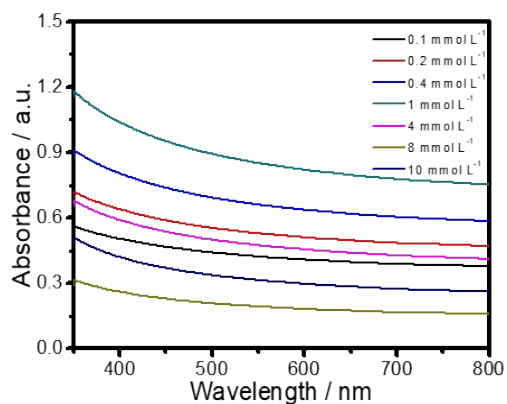


Figure S3: UV absorption spectra of graphene-flakes dispersion in different concentration of SAIL in aqueous medium.

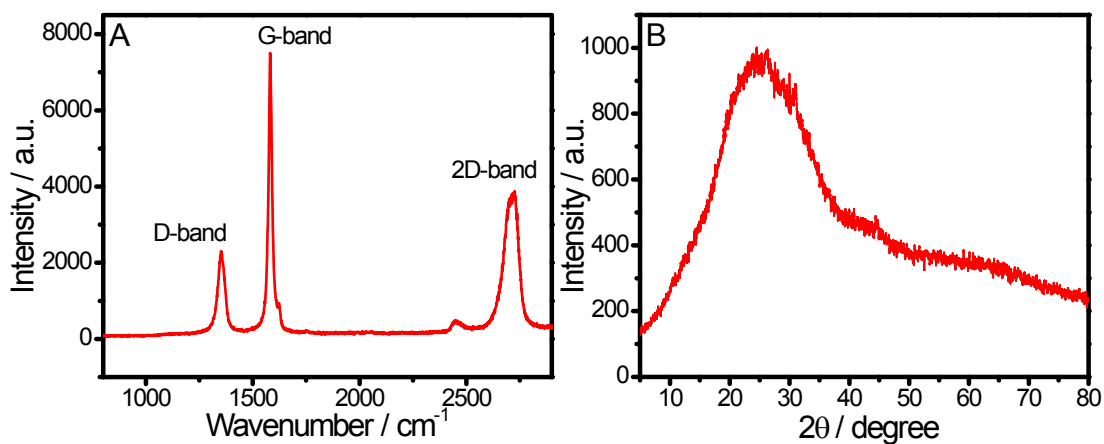


Figure S4: (A) Raman Spectrum ($I_D/I_G = 0.32$) and (B) XRD pattern of graphene-flakes extracted from hydrogel.

Table S1: Various parameters obtained from SANS measurements.

Sample	Semi-major axis a (nm)	Semi-minor axis b=c (nm)	Charge q (e.u.)
5 mmol L ⁻¹	4.5	1.7	-
10 mmol L ⁻¹	8.9	1.9	-
20 mmol L ⁻¹	12.1	2.0	-
50 mmol L ⁻¹	21.2	2.1	40
100 mmol L ⁻¹	22.8	2.1	34
150 mmol L ⁻¹	24.2	2.1	32