

Supporting Information

Synthesis of ionic liquids. 1-Butyl-3-methyl-imidazolium dodecylsulfate, [Bmim][DS] was synthesized by ion exchange reaction between [Bmim][Cl] and SDS according to the procedure reported elsewhere.[1] Briefly SDS and [Bmim][Cl] were stirred in dichloromethane for 4 hours at room temperature. The precipitate formed was removed by filtration. The organic phase was washed with water to make it chloride free, which was confirmed by absence of precipitate formation on titration with silver nitrate in acidic aqueous solution. The white waxy solid, [Bmim][DS] obtained was dried in vacuo for 48h. A similar procedure using ion exchange reaction between [Bmim][Cl] and AOT was employed to synthesize [Bmim][AOT], as per reported procedure[2]. The synthesized surfactants were characterized by ^1H NMR (**Fig S1 and S2**), which tallies well with the literature [1, 2].

^1H NMR. The stock solutions of two synthesized ionic liquids; [Bmim][C] and [Bmim][AOT] prepared in CDCl_3 were syringed in NMR tubes after proper dilution for characterization. The spectra were recorded with a Bruker Biospin Switzerland Avance-III Spectrometer working at 400 MHz. The chemical shifts in ppm (δ) are presented as below whose reproducibility was within 0.01.

[Bmim][DS]: ^1H NMR (500 MHz, CDCl_3): (δ = 0.87–0.90, 0.95–0.98) (a, 6H), (δ = 1.25–1.38) (b, 20H), (δ = 1.65–1.72) (c, 2H), (δ = 1.84–1.92) (d, 2H), (δ = 4.03–4.07) (e, f, 5H), (δ = 4.23–4.26) (g, 2H), (δ = 7.28–7.29) (h, 1H), (δ = 7.37–7.38) (i, 1H), (δ = 9.48) (j, 1H).

[Bmim AOT]: ^1H NMR (400 MHz, CDCl_3) δ 0.86 (a, 15H), 0.80–1.43 (b, 18H), 1.43–1.75 (c, 2H), 1.75–1.92 (d, 2H), 2.47–4.28 (e, f, g, h, i, 12H), 7.38 (j, 1H), 7.49 (k, 1H), 9.51 (l, 1H)

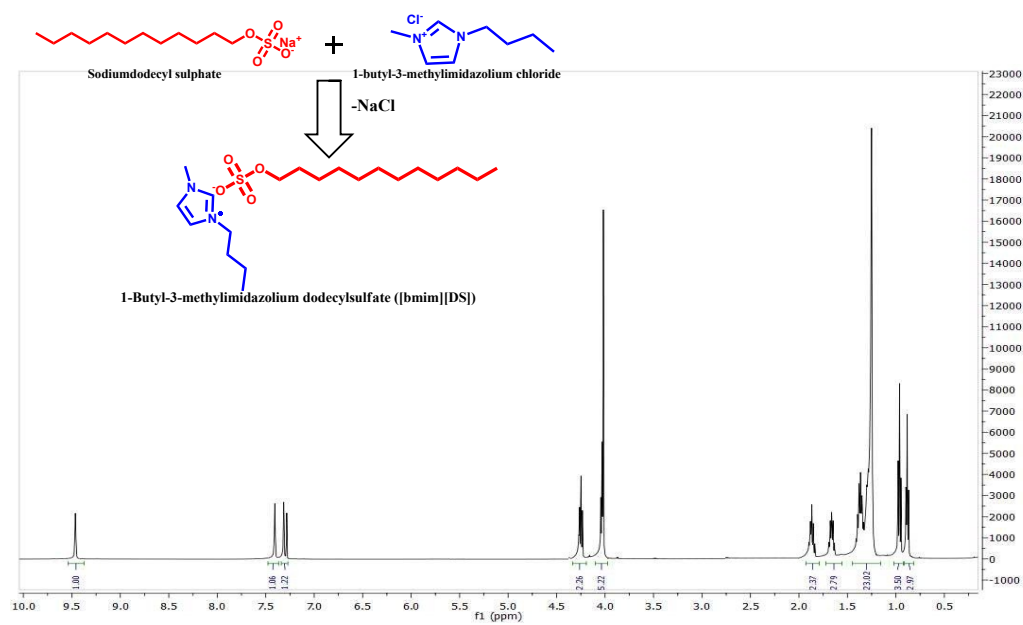


Figure S1. ^1H -NMR spectrum of [bimim][DS] (Inset: Ion exchange reaction for synthesis of [bimim][DS]).

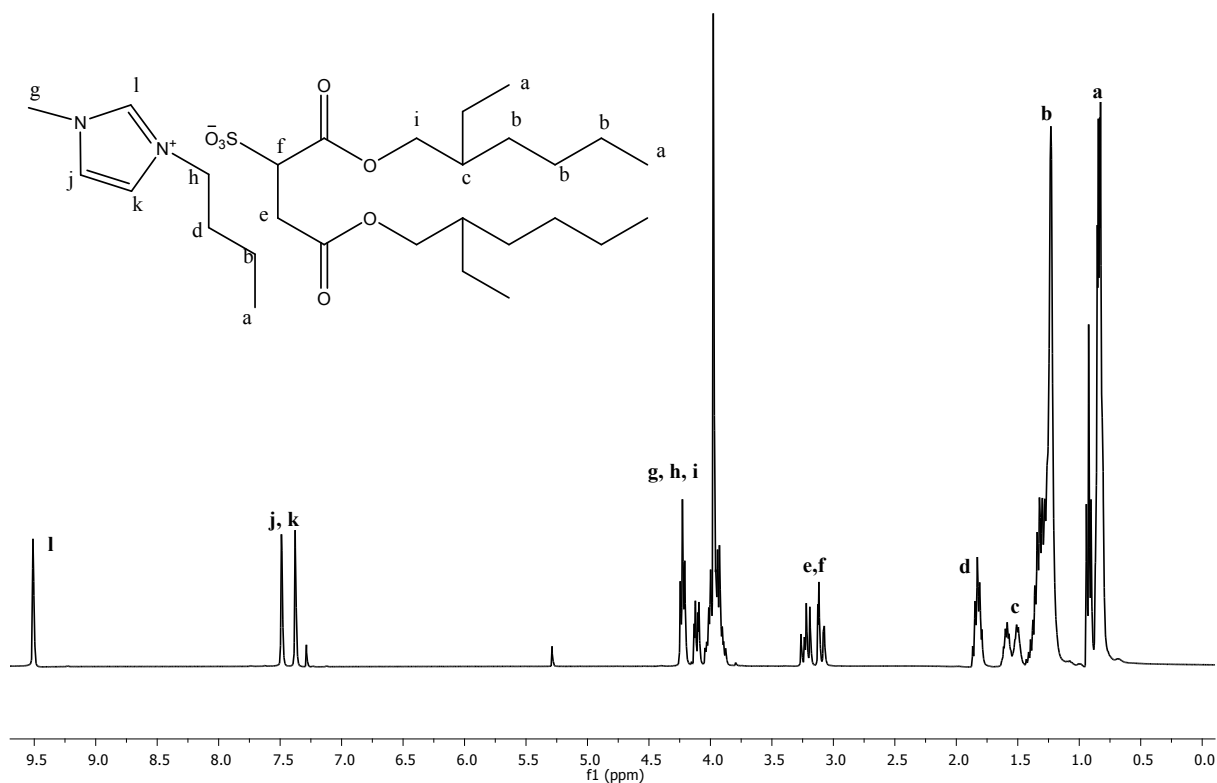


Figure S2. ^1H -NMR spectrum of [bimim][AOT]

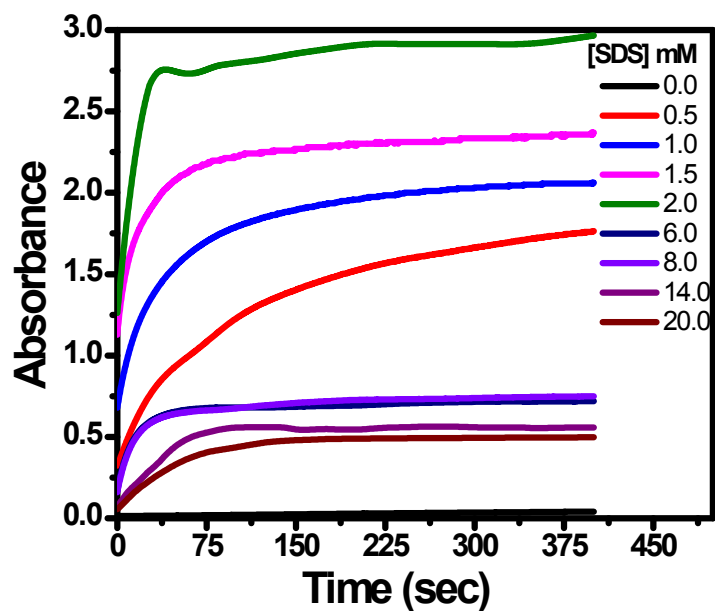


Figure S3. Variation of absorbance of reaction mixture ($[\text{Cu}(\text{NC})_2]^{2+}$ (0.17mM) and Fe^{2+} (0.17mM)) at 450 nm with time in SDS

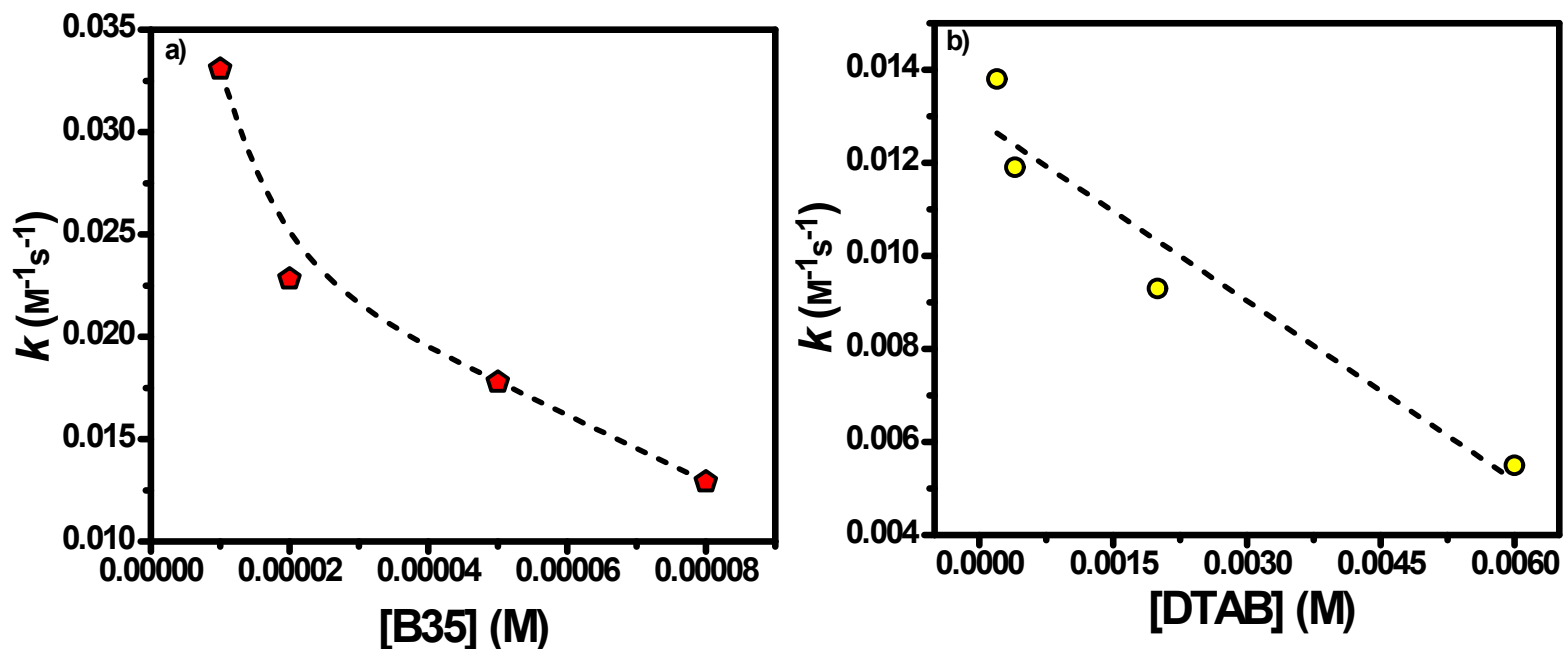


Fig 4S: Second order rate constant of the reaction between $[\text{Cu}(\text{NC})_2]^{2+}$ and Fe^{2+} as a function of concentration of a) B35 b) DTAB

References

- [1] O.A. Chat, M. Maswal, P.A. Hassan, V.K. Aswal, G.M. Rather, A.A. Dar, Effect of mixed micellization on dimensions of 1-butyl-3-methylimidazolium dodecylsulfate micelles in presence of electrolytes, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 484 (2015) 498-507.
- [2] P. Brown, C.P. Butts, J. Eastoe, D. Fermin, I. Grillo, H.-C. Lee, D. Parker, D. Plana, R.M. Richardson, Anionic Surfactant Ionic Liquids with 1-Butyl-3-methyl-imidazolium Cations: Characterization and Application, *Langmuir*, 28 (2012) 2502-2509.