

Supporting Information

pH changes in the micelle-water interface of surface-active ionic liquids dictate the stability of encapsulated curcumin: An insight through a unique interfacial reaction between arenediazonium ion and *t*-butyl hydroquinone

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FT-IR of SAILs:

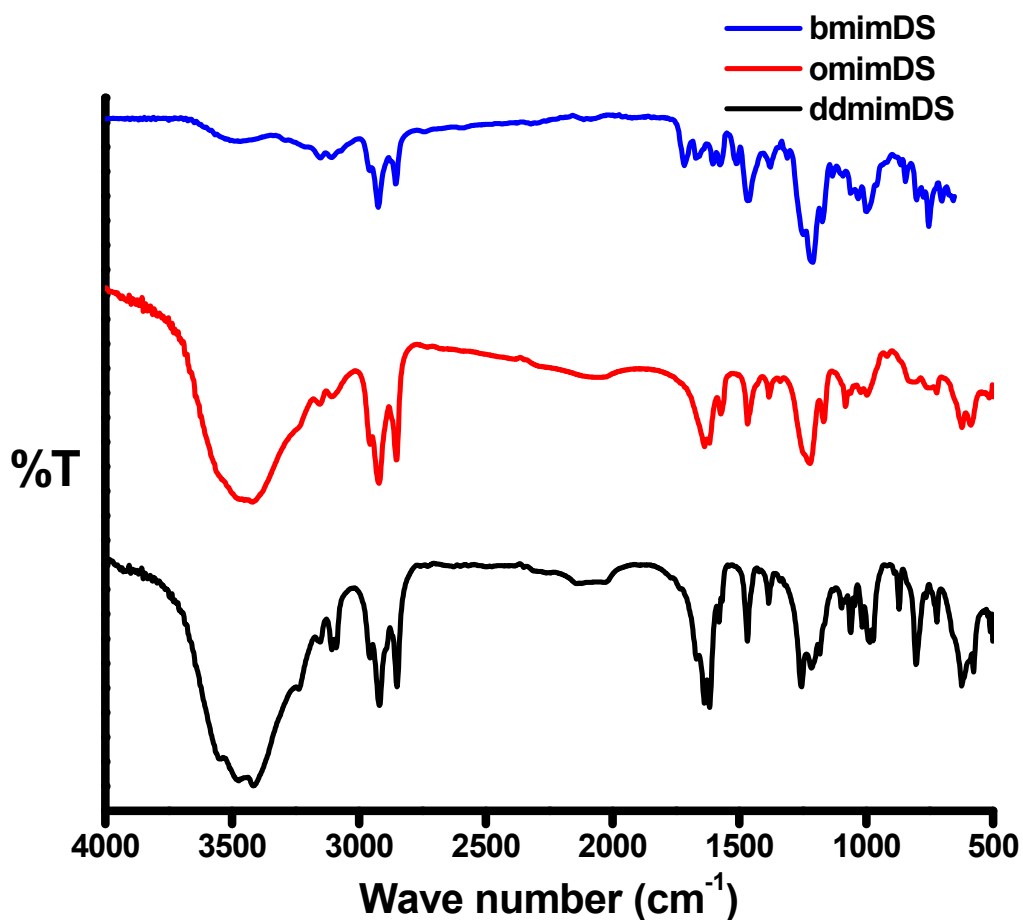


Figure S1. FT-IR spectra of bmimDS, omimDS and ddmimDS

Spectral data of SAILs is given as below:

FT-IR (cm⁻¹) bmimDS: 3466 (N-H s), 2855 (C-H s), 1669 (C=C s), 1607 (C=N s), 1207 (S-O s)

FT-IR (cm⁻¹) omimDS: 3417.8 (N-H s), 2850.7 (C-H s), 1637.1 (C=C s), 1619.1 (C=N s), 1222.2 (S-O s)

FT-IR (cm⁻¹) ddmimDS: 3417.6 (N-H s), 2850.0 (C-H s), 1637.8 (C=C s), 1618.1 (C=N s), 1216.2 (S-O s).

Absorbance Data with Time shows the Biexponential kinetics and not monoexponential kinetics.

The typical kinetic plots showing the decrease in absorbance of the probe during its reduction by TBHQ at different concentrations in 3 mM OmimDS as prototype at pH 5.5 is represented in figure 2Sa. The kinetic data fitted very well to the biexponential decay equation 9 of the manuscript. The monoexponential fit shows the R-Square value of 0.988 which is very low for such a large number of experimental points. However, biexponential fit shows R-Square value of 0.999 which is statistically very well accepted for such a large number of data points. The adjacent figure (Figure 2Sb) shows the plot of $\log((A_t - A_\infty)/(A_0 - A_\infty))$ vs time where A_0 , A_∞ and A_t are absorbance values at zero time, at infinity and at time t in first plot. This data should fit a straight line if it follows the monoexponential equation. As clearly seen, there is a deviation from the straight line indicating a complex reaction mechanism that is explained by the biexponential fit equation as discussed in the manuscript. Similar observation was found for all the systems discussed in the manuscript.

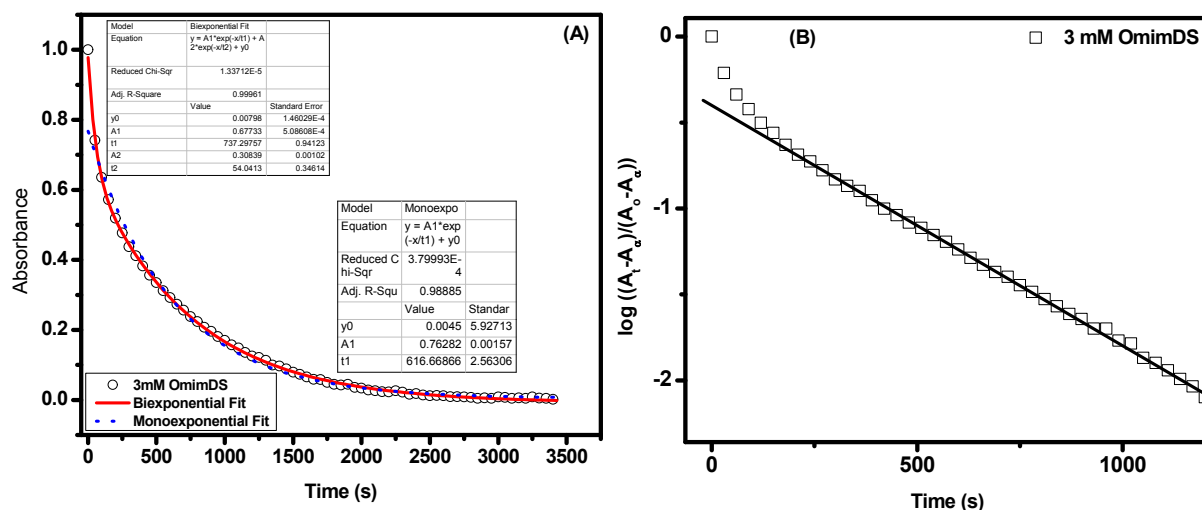


Figure S2: Plots of A) absorbance vs time, B) $\ln((A_t - A_\infty)/(A_0 - A_\infty))$ vs time of 16-ArN₂⁺ with TBHQ in 3 mM OmimDS at pH 5.5 and 25 °C. Here, A_t , A_∞ and A_0 are the absorbance values at time t , infinity and zero respectively. The plots show that the experimental data fits the biexponential kinetics and not monoexponential one.

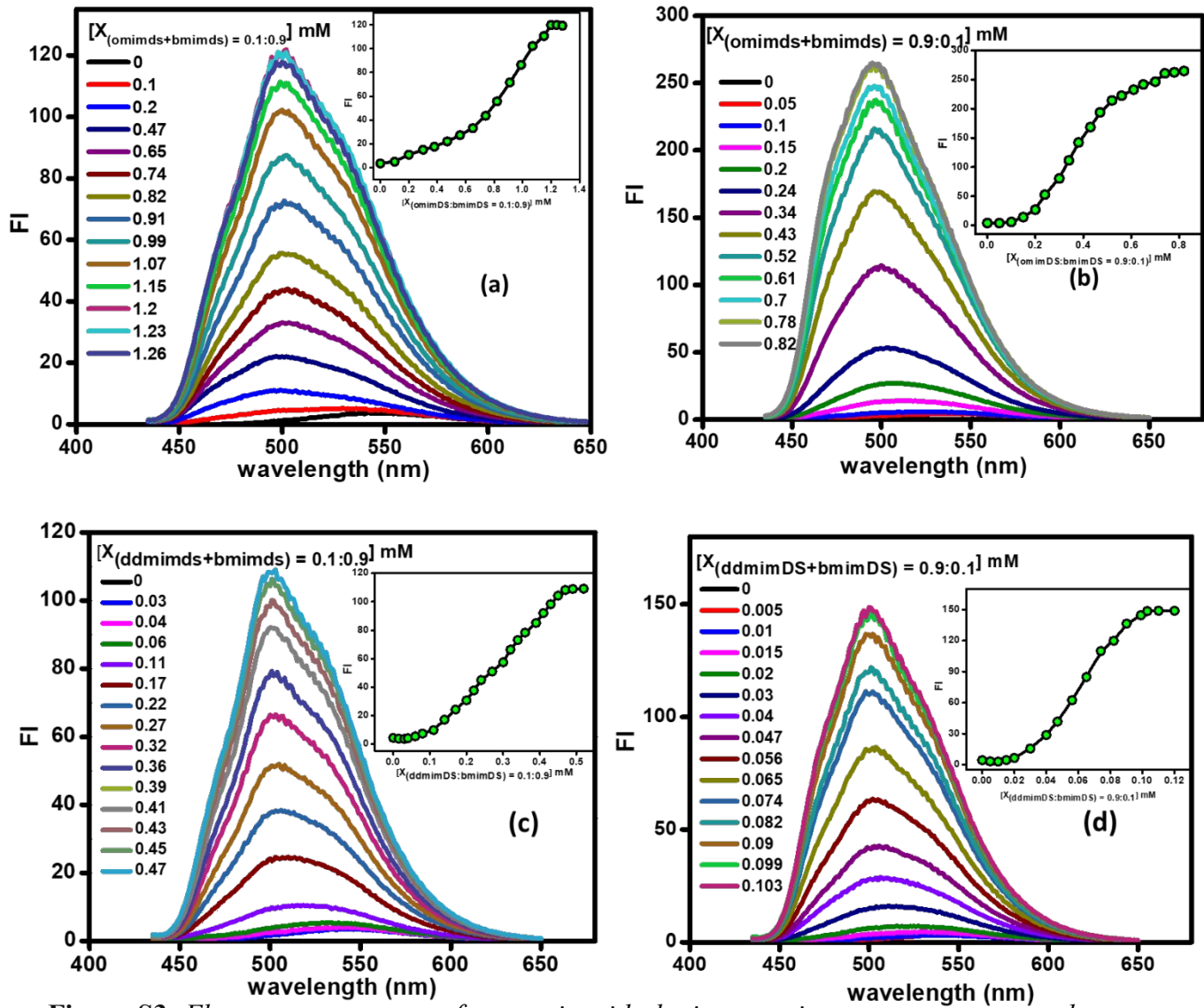


Figure S3. Fluorescence spectra of curcumin with the increase in the concentration of (a) $X_{omimDS+bmimDS}$ (0.1:0.9) (b) $X_{omimDS+bmimDS}$ (0.9:0.1) (c) $X_{ddmimDS+bmimDS}$ (0.1:0.9) and (d) $X_{ddmimDS+bmimDS}$ (0.9:0.1) (insets represent the change in fluorescence intensity as a function of surfactant concentration).