Interaction of Gelatin with Room Temperature Ionic Liquids: A Detailed Physicochemical Study

Tejwant Singh§, Shilpi Boral‡, H. B. Bohidar‡, Arvind Kumar*§

Supporting Information

(1) \( \Gamma_{\text{max}} \) is calculated following the Gibbs adsorption equation:
\[
\Gamma_{\text{max}} = -\frac{1}{(2.303R\ln T)} \Delta C_{2nC} \frac{d\gamma/d\log[C]}{nR}
\]
where \( n, R, T \) and \([C]\) are the number of species formed per IL molecule in solution upon ionization (it was 2 for both \([C_8\text{mim}][\text{Cl}]\) and \([C_4\text{mim}][C_8\text{OSO}_3]\)), the universal gas constant, absolute temperature and the molar concentration of IL in solution respectively. Here concentration was used in place of activity, as the solutions used were fairly dilute.\(^1\)\(^3\)

(2) \( \Lambda_{\text{min}} \) was obtained from the relation:
\[
\Lambda_{\text{min}} = 10^{19} / N_A \Gamma_{\text{max}}
\]
Where \( N_A \) is the Avogadro number.\(^1\)\(^3\)

(3) \( \Delta G'_{\text{ad}} \) is calculated from the equation:
\[
\Delta G'_{\text{ad}} = \Delta G_{\text{melt}} - \left( \pi / \Gamma_{\text{max}} \right)
\]
where \( \pi \) is the surface pressure at the saturated air/solution interface and is calculated as:
\[
\pi = \gamma_0 - \gamma_{\text{cmc}}
\]
where \( \gamma_0 \) the surface tension of the buffer with and without gelatin and \( \gamma_{\text{cmc}} \) corresponds to surface tension of IL solutions at \( \text{cmc} \) with and without gelatin respectively.\(^1\)\(^3\)

References