

Self-assembly of Surface-active Ionic Liquid as Modulated by Bile Salt: A DLS and SANS Study [†]

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Abstract: The present study was undertaken to unveil the self-assembly of an amphiphilic surface-active ionic liquid in the presence of bile salt. In the present communication, we report the formation of rod-like micelles from the mixtures of a surface-active ionic liquid (IL) and bile salt (BS). Mixed micelles of sodium deoxycholate (NaDC) and sodium cholate (NaC) with 1-decyl-3-methylimidazolium chloride (C₁₀mim Cl) have been assessed by spectral and scattering techniques. These bile salts display electrostatic and hydrophobic interactions with the IL. The incorporation of bile salts in IL micelles increases solution viscosity, suggesting micellar growth and transitions. These observations are confirmed by dynamic light scattering (DLS) and further supported by small-angle neutron scattering (SANS). The unusual viscosity behavior was observed by altering the solution pH. NMR provided information on deeper penetration of NaDC molecules in IL micelles. Such a bile salt-induced sphere-to-rod micellar transition further modulated by pH is of its first kind in the IL-bile salt mixed system.

Keywords: C₁₀mim Cl; bile salt; micellar transition.

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Conflicts of Interest

The authors declare no conflict of interest.