

Abstract Submitted  
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**Vibrational Relaxation of Anions in Nonaqueous Reverse Micelles** GERALD SANDO, JEFFREY OWRUTSKY, Chemistry Division, US Naval Research Laboratory — Static and ultrafast infrared spectroscopy have been used to measure vibrational frequencies and vibrational energy relaxation (VER) times for high frequency bands of small ions in nonaqueous reverse micelles (RMs). Formamide RMs are stable with anionic (AOT) and nonionic surfactants. In AOT RMs, the vibrational frequencies of azide ( $\text{N}_3^-$ ) are blue shifted, while the VER times are slower. Bulk behavior is approached as the RM size increases. The frequency-rate correlation is opposite of what is seen in bulk solvents and aqueous RMs. The effects are small in nonionic RMs because azide near surfactant headgroups resembles that in formamide, as shown by results in TGE, a model of the polar portion of the surfactant. The dynamics for  $\text{Fe}(\text{CN})_5\text{NO}^{2-}$  depend on the probe frequency because of the inhomogeneous distribution of solvation sites throughout the poorly defined interface. Ionic liquid containing reverse micelles are formed with nonionic surfactants. The VER rates of the ionic liquid anions are faster than in the bulk ionic liquids, but slower than in TGE, consistent with a mixed solvation environment of ionic liquid and surfactant.

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