



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: **“Site-selective Probing of Surfactant Assemblies using Excited State Proton Transfer of Pyranine”**

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SHORT ABSTRACT

The thesis includes our investigations on the nature and behavior of water entrapped in the nano-confined surfactant assemblies, in particular, reverse micelles and micelles. The hydration behavior depends critically on the type of polar headgroup of surfactants and also on the presence of co-surfactants. We mainly employed the hydration sensitive excited state proton transfer (ESPT) property of a site selective anionic probe 8-hydroxypyrene-1, 3, 6-trisulfonate (HPTS or pyranine) to study these systems.

In *chapter 1*, we briefly discuss the recent trends of various ESPT studies in different confined media and summarize how these dynamics differ from that in bulk water. *Chapter 2* includes the summary of measurement techniques and experimental methods that we adopted in our studies. In the *chapter 3*, we investigated the effect of confinement on the solubility behaviour of the water pool of water/AOT/n-heptane reverse micelle towards a so called insoluble alcohol *n*-octanol. In *Chapter 4*, we confirmed the presence of finite level of hydration at the interface of a cationic surfactant reverse micelle (water/ BHDC/ benzene) by detecting non-negligible ESPT. The effect of co-surfactant on the hydration at the interfacial region of a quaternary water/CTAB/octanol/cyclohexane reverse micelle is discussed in the *chapter 5*. The modification of the interfacial hydration associated with the structural transition of water/DDAB/cyclohexane reverse micelle from rod to sphere is discussed in the *chapter 6*. In the *chapter 7*, we compared the interfacial properties between micelles formed by two different surfactants- zwitterionic sulfobetaine (SB12 and SB16) and cationic *n*-alkyl tertiary ammonium (DTAB and CTAB).