Post centennial of micelles: an overview

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Micelles of different types and properties are basically formed by the assembly of surfactants. The conditions for the formation of micelles, their shapes, sizes and morphologies are also different, and are discussed for surfactants, block copolymers and ionic liquids in the present article. Theories by Debye and others, Markov chain model, ladder model of micelle growth are employed to understand in detail the thermodynamics of micelles and mixed micelles formation. Apart from these, other concepts like effect of additives on micelle formation, application of polymeric, multicompartment micelles in drug delivery, fundamentals of formation of single and double critical micelle concentration and computer simulation methods for amphiphile aggregation are reviewed in the present study.

Keywords: Computer simulation, micelle, mixed micelles, polymeric micelles, second CMC.

the reverse micelle the hydrophilic head-group of the surfactant is oriented towards inside, and the hydrophobic tail is in contact with a hydrocarbon solvent (oil). A small amount of water (or hydrophilic substance) can be accommodated in the core. Figure 1 *f* represents a three-dimensional model[8]. Figure 1 *g* represents a torus like micelle[9]. There are several discussions available in the literature on the structure of micelles. We mention a few of them in the present article and have listed some more sources for readers to refer[10–14]. Fromherz[15] used two well-known micelle models – the compact droplet and bilayer models. Menger[16,17] suggested a model for micelle which was slightly different from those of Hartley and Fromherz. According to Menger[16,17] 'micelles are elusive, transient, fluctuating and disordered assemblages'. In the Menger model[16,17], surfactant molecules are in a disorganized state, the surface is rough and has water-filled domains. Some hydrocarbon chains of surfactants on micelle sur-