

Formation of water-in-oil (W/O) nano-emulsions in a DDAB/D2O/N-Tetradecane systems prepared by a low-energy emulsification method

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The formation, properties & applications of nano-emulsions are reviewed and summarized. Nano-emulsion droplet sizes fall typically in the range of 20-200 nm & show narrow size distributions. Although most of the publications on either oil-in-water (O/W) or water-in-oil (W/O) nano-emulsions report their formation by dispersion or high-energy emulsification methods, an increased interest is observed in the study of nano-emulsion formation by condensation or low-energy emulsification methods. Phase behaviour studies have shown that the size of the droplets is governed by the surfactant phase structure at the inversion point induced by either temperature or composition. Three aspects have been the focus of this study: how to make w/o (DDAB/D2O/Tetradecane)nano-emulsion;nano-emulsion stability;thermo-physical properties by modified T-history method. Experimental results showed that nano-emulsion droplet sizes fall typically in the range of 5-300 nm, thermo-physical properties of material could be attractive candidates as thermal energy storage materials for cold-chain systems like vaccine-shipping and food packaging.