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Influence of carboxymethylcellulose (NaCMC) on the aggregation and micellization behaviors in aqueous cethylpyridinium chloride solutions: thermodynamic study and effect of polymer concentration

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Abstract

In the present work, we applied Dynamic Light Scattering (DLS), conductivity and rheological measurements in order to assess the most important characteristics of the interaction between sodium carboxymethylcellulose (NaCMC) and cethylpyridinium chloride (CPCI). We evaluate the effect of temperature and weight-percentage concentration of added NaCMC on critical aggregation (cac) and CPCI-critical micellization concentrations (cmc*) for mixtures NaCMC/CPCI in aqueous solutions. Careful energetic analyses showed that micellization of CPCI in water is entropically driven and exothermic in presence of NaCMC, while for NaCMC /CPCI aggregation, enthalpic and entropic terms are both important. The process of forming micelle-decorated NaCMC skeletons at the cac is more favored by heating and less favored when we add more quantities of NaCMC at fixed temperature. DLS

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