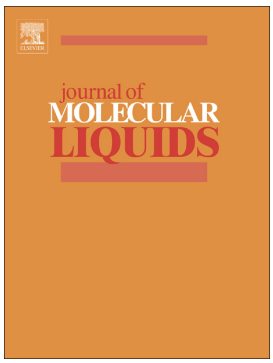

Influence of carboxymethylcellulose (NaCMC) on the aggregation and micellization behaviors in aqueous cethylpyridinium chloride solutions: Thermodynamic study and effect of polymer concentration

Hasna Faten Mahjoub, Zaineb Aouissi, T. Othman

PII: S0167-7322(18)30382-9
DOI: doi:10.1016/j.molliq.2018.06.037
Reference: MOLLIQ 9235

To appear in: *Journal of Molecular Liquids*

Received date: 24 January 2018
Revised date: 7 May 2018
Accepted date: 10 June 2018

Please cite this article as: Hasna Faten Mahjoub, Zaineb Aouissi, T. Othman , Influence of carboxymethylcellulose (NaCMC) on the aggregation and micellization behaviors in aqueous cethylpyridinium chloride solutions: Thermodynamic study and effect of polymer concentration. Molliq (2017), doi:10.1016/j.molliq.2018.06.037

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

Hasna Faten Mahjoub[1,2,*], Zaineb Aouissi[1], T. Othman[1]

[1] Laboratoire de Physique de la Matière Molle et de Modélisation Electromagnétique (LP3ME), LR99ES16, Faculté des Sciences Physiques, Mathématiques et Naturelles de Tunis, Campus Universitaire 1060, Université TUNIS EL MANAR - TUNISIA

[2]Institut National des Sciences Appliquées et de Technologie, (INSAT) Centre Urbain Nord, La Charguia, TUNIS- Université CARTHAGE - TUNISIA

*Corresponding author: Hasna Faten Mahjoub , E-mail: hasnafaten.mahjoub@gmail.com

Keywords:

Sodium carboxymethylcellulose

Cethylpyridinium chloride

Critical aggregation behavior

Aggregation thermodynamics

Micellization thermodynamics

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 (CPCl). We evaluate the effect of temperature and weight-percentage concentration of added NaCMC on critical aggregation (cac) and CPCl-critical micellization concentrations (cmc*) for mixtures NaCMC/CPCl in aqueous solutions. Careful energetic analyses showed that micellization of CPCl in water is entropically driven and exothermic in presence of NaCMC, while for NaCMC /CPCl 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