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Studies on solution behavior of xanthan gum in presence of cationic surfactants

Interaction between the polymer and surfactant has been extensively studied for its widespread applications in many industries. They play an outstanding role in pharmaceuticals, detergents, pesticides, cosmetics, and enhanced oil recovery. Specific interests on the polymer and ionic surfactant systems are because of its characteristic physicochemical properties at different possible combinations. The characteristic behavior of polymer with surfactant is similar to surfactant micellization in solution and occurs above a critical aggregation concentration (cac) which is lower than the corresponding critical micelle concentration (cmc). It is well known that the hydrophobic character of both the polymer and surfactant is responsible for the interaction. The nature of these interactions has been investigated and reported by few researchers that surfactants at high concentration can displace polymer from the air/water interface depending on the system. Limited work has been reported on interaction of xanthan gum with CTAB and gemini surfactant (16-5-16). Therefore, present study describes the interaction between the cationic gemini (16-5-16) surfactant and their conventional counterpart with a polymer at different temperatures and to see the effect of hydrophobicity and the molecular interactions by using the surface tension measurements. The purpose of this study was to investigate the interaction between water soluble polymer (xanthan gum) with cetyltrimethylammonium bromide (CTAB), and gemini surfactant, bis-(hexadecyldimethylammonium) pentane di-bromide (16-5-16) at two temperatures 310.15 K and 318.15 K by using surface tension measurement. The behavior of surfactant-polymer interaction was found to be dependent on both surfactant and polymer concentrations. After the critical aggregation concentration (cac), interaction between the water soluble polymer and surfactants was observed and above the critical micelle concentration (cmc), normal micelle formation was seen and later polymer was saturated by surfactant with no further change of surface tension of the solution for particular concentrations of the polymer solution. It was found that the gemini surfactant interacts strongly with xanthan gum as compared to conventional surfactant CTAB.

Biography

M Kamil is currently the Professor and Chairman of the Petroleum Studies department, Z H College of Engineering and Technology, AMU Aligarh. He has received his BSc (Chemical) degree from AMU Aligarh, MTech from Indian Institute of Technology, Roorkee, India and his PhD in 1993. His research mainly focuses on heat transfer in two-phase flow, natural flow boiling, petroleum processing, modeling & simulation and polymer surfactant interactions. He and his co-workers have published more than 130 articles in the international and national journals, and conference proceedings. He has been on the organizing committee for several international and national conferences.

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