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研究论文

丙烯酰胺型阴离子表面活性单体的化学结构与其胶束化行为

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摘要 对两种丙烯酰胺型阴离子表面活性单体(2-丙烯酰胺基十四烷磺酸钠, $NaAMC_{14}S$; 2-丙烯酰胺基十二烷磺酸钠, $NaAMC_{12}S$)的化学结构与胶束化行为的关系进行了较深入的研究. 使用紫外分光光度法测定了$NaAMC_{14}S$, $NaAMC_{12}S$及十二烷基磺酸钠(SDS)在水中的溶解度, 同时采用表面张力法(环法)测定了它们在不同温度下的临界胶束浓度CMC; 采用稳态荧光探针法测定了不同浓度的胶束聚集数与本征胶束聚集数. 实验结果表明, 与普通表面活性剂相比, 由于丙烯酰胺型阴离子表面活性单体分子中具有两个亲水头基, 在水中的溶解性能较强, 故具有较低的Krafft温度; 在溶液表面的饱和吸附量低, 故降低水表面张力的能力较差, 即表面活性差; 疏水缔合的胶团较为疏松, 故聚集数很小; 胶束内分子间的疏水相互作用较弱, 故临界胶束浓度CMC较高.

关键词 表面活性单体 丙烯酰胺型 胶束化行为 结构 性能

分类号

Chemical Structure and the Micellization Behavior of Acrylamide-type Anionic Surface-Active Monomers

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Abstract The relationship between chemical structure and micellar behaviour for two kinds of acrylamide-type anionic surfmers (sodium 2-acrylamido-tetradecane sulfonate, $NaAMC_{14}S$; sodium 2-acryla- mido-dodecane sulfonate, $NaAMC_{12}S$) were studied fully. The solubility of $NaAMC_{14}S$, $NaAMC_{12}S$ and sodium dodecyl sulfonate (SDS) were determined by UV spectrophotometry. The critical micelle concentrations (CMC) at different temperatures were measured by using surface tension method, and their aggregation numbers of micelles were determined by steady-state fluorescence probe method. The experiment results show that the acrylamide-type anionic surfmers have strong solubilities in water because there are a pair of hydrophilic head groups in their mole-cules, resulting in lower Krafft temperatures, greater molecular areas on the aqueous solution surface and lower surface adsorption amounts. So their abilities to decrease surface tension of water are poor (*i.e.* poor surface activities). Compared with general surfactants, they have higher critical concentrations due to weaker hydrophobic interaction. They have much smaller aggregation numbers of micelles owing to the loose micelles.

Key words surface-active monomer acrylamide-type micellization behavior structure property

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