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研究论文

最大泡压法研究C_{12}-2-E_x-C_{12}•2Br在气/液表面的吸附动力学

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摘要 用最大泡压法考察季铵盐Gemini表面活性剂C_{12}-2-E_x-C_{12}?2Br (x＝1, 2, 3)在气/液表面吸附动力学行为, 研究表明增加表面活性剂体相浓度和温度将加快分子扩散速度, 因此提高了表面吸附的动力学效果. 增加联接链长度x减小了分子预聚集倾向, 溶液中的单分子浓度增加, 有利于初始扩散, 使γ_t降低. 接近饱和吸附时, 由于x较大的单元分子在表面层占据的截面积也较大, 降低了表面层甲基端基的覆盖度, 相对升高了介平衡表面张力. 与对应的同头基同碳原子数的十二烷基三甲基溴化铵(C_{12}TABr)比较, C_{12}-2-E_1-C_{12}?2Br分子更倾向于吸附在表面层上.

关键词 季铵盐Gemini表面活性剂 动态表面张力 最大泡压法

分类号

Adsorption Kinetics of C_{12}-2-E_x-C_{12}•2Br at the Water-Air Interface Studied by Maximum Bubble Pressure Technique

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Abstract Adsorption kinetics of Gemini surfactant C_{12}-2-E_x-C_{12}?2Br (x＝1, 2, 3) at the water-air interface was studied by maximum bubble pressure technique. The kinetics effect of adsorption was enhanced when the bulk concentration or the temperature was increased because the surfactant molecules moved faster from the bulk to the surface. Since the molecules with short spacer chains were easy to pre-aggregate as compared with those with long spacers, the concentration of mono molecules of the latter in the bulk was higher than that of the former, which promoted the diffusion of the former molecules to the surface in the short time and decreased the γ_t more quickly. However, in the long time as the surface was nearly completely covered, the γ_m of surfactant with long spacer was high because this kind of molecules occupied large surface areas resulting in less endmost methyls of them protruding into the air. Compared with the conventional surfactant C_{12}TABr which had the same kind of head group and the same length of hydrophobic chain as C_{12}-2-E_x-C_{12}?2Br, the latter seemed more favorable to adsorb at the surface than the former.

Key words Gemini surfactant dynamic surface tension maximum bubble pressure technique

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