

研究论文

微量热法研究阴离子表面活性剂在DMA/长链醇体系中CMC和热力学函数

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**摘要** 在*N,N*-二甲基乙酰胺(DMA)/长链醇非水溶液体系中, 利用微量热仪, 研究阴离子表面活性剂十二烷基酸钠(SLA)、十二烷基硫酸钠(SDS)的临界胶束浓度(CMC)和热力学函数。本文在十二烷基酸钠, 十二烷基硫酸钠的*N,N*-二甲基乙酰胺溶液中, 分别加入长链醇(庚醇、辛醇、壬醇、癸醇), 测定体系的热功率-时间曲线, 借助热力学理论, 由测得曲线, 进一步得到临界胶束浓度和热力学函数( $\Delta H_m^0$ ,  $\Delta G_m^0$  和  $\Delta S_m^0$ )。讨论了温度、醇的碳原子数目、醇的浓度与热力学参数之间的关系。结果表明, 对十二烷基酸钠或十二烷基硫酸钠的DMA溶液, 在含有相同浓度的各种醇的体系中, CMC,  $\Delta H_m^0$  和  $\Delta S_m^0$  的值随着温度的升高而增加, 而  $\Delta G_m^0$  的值随着温度的升高而降低。在相同温度及相同浓度的醇体系中, CMC,  $\Delta H_m^0$ ,  $\Delta G_m^0$  和  $\Delta S_m^0$  的值都随着醇中碳原子数目的增加而降低。在相同温度及相同醇的体系中, CMC,  $\Delta G_m^0$  的值随着醇的浓度的增加而增大, 而  $\Delta H_m^0$ ,  $\Delta S_m^0$  的值随着醇的浓度的增加而减少。

**关键词** [微量热法](#) [N,N-二甲基乙酰胺](#) [十二烷基酸钠](#) [十二烷基硫酸钠](#) [长链醇](#) [临界胶束浓度](#) [热力学函数](#)

分类号

**Studies on the CMC and the Thermodynamic Function of the Anionic Surfactants in the DMA/Long-chain Alcohol Systems Using a Microcalorimetric Method**

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**Abstract** The critical micelle concentration (CMC) and thermodynamic function of anionic surfactant sodium laurate (SLA) and sodium dodecyl sulfate (SDS) in the *N,N*-dimethylacetamide (DMA)/long-chain alcohol systems were studied using titration microcalorimetric method. The power-time curves of SLA and SDS with the presence of long-chain alcohol (*n*-heptanol, *n*-octanol, *n*-nonanol and *n*-decanol) in DMA system were determined. Then, from the curves, the CMC and thermodynamic functions ( $\Delta H_m^0$ ,  $\Delta G_m^0$  and  $\Delta S_m^0$ ) were obtained by thermodynamic theory. The relationships between temperature, alcohol's carbon number, concentration and thermodynamic properties were discussed. For SLA or SDS in DMA solution, under the same concentration of alcohol, the values of CMC,  $\Delta H_m^0$  and  $\Delta S_m^0$  increase, while the values of  $\Delta G_m^0$  decrease with the increment of the temperature. Under the same condition of identical temperature and alcohol's concentration, the values of CMC,  $\Delta H_m^0$ ,  $\Delta G_m^0$  and  $\Delta S_m^0$  decrease with the increment of the alcohol's carbon number. In the presence of the same kind of alcohol, the values of CMC and  $\Delta G_m^0$  increase, but the values of  $\Delta H_m^0$  and  $\Delta S_m^0$  decrease with the concentration increasing in alcohol series at the same temperature.

**Key words** [microcalorimetric method](#) [N,N-dimethylacetamide](#) [sodium laurate](#) [sodium dodecyl sulfate](#) [long-chain alcohol](#) [CMC](#) [thermodynamic function](#)

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