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研究简报

三种氨基酸从水到**DMSO**水溶液的迁移焓研究

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摘要 用微量量热法测定甘氨酸、*L*-丙氨酸、*L*-丝氨酸在二甲基亚砜(DMSO)水溶液中的溶解焓, 计算得到三种氨基酸从水到DMSO水溶液的迁移焓, 根据共球交盖模型对氨基酸与DMSO在水溶液中的相互作用进行讨论, 并与前期的氨基酸在尿素水溶液体系中的迁移焓进行比较. 结果显示, 氨基酸与共溶剂分子之间产生的静电相互作用以及亲水-亲水相互作用对氨基酸迁移焓有负贡献, 而亲水-疏水、疏水-疏水相互作用对氨基酸迁移焓有正贡献. 与尿素水溶液中氨基酸迁移焓的绝对值随尿素浓度的增加而增加, 并规律性地出现多个变化点的情况不同, 氨基酸从水到DMSO水溶液的迁移焓随DMSO浓度的增加而线性增加. 这种差异反映了尿素与DMSO及其水溶液结构的不同, 为认识尿素在水溶液中的缔合作用提供了对比依据.

关键词 氨基酸 二甲基亚砜 迁移焓

分类号

Transfer Enthalpy of Three Kinds of Aminoacids from Water to Aqueous Solution of DMSO

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Abstract Enthalpy of solution of glycine, *L*-alanine or *L*-serine in water and aqueous solutions of dimethyl sulfoxide (DMSO) was measured at 298.15 K. Transfer enthalpy, $D_{tr}H$, of aminoacids from water to aqueous solutions of DMSO was derived, interpreted qualitatively with cosphere overlap model and compared with the values from water to aqueous solutions of urea in our previous work. The results show that the contribution to the transfer enthalpy of electrostatic interaction and hydrophilic-hydrophilic type structure interaction between solute and cosolvent molecule was negative, while that of hydrophilic-hydrophobic and hydrophobic-hydrophobic type structure interaction was positive. Different from the fact that the absolute value of transfer enthalpy of aminoacids from water to aqueous solutions of urea was overall increased with the concentration increase of urea with regular breaks, the results for water-DMSO mixtures were linearly increased with the increased content of cosolvent. The behavior of $D_{tr}H$-composition profile could characterize the structure feature of solvent, providing thermodynamic evidence of the self-association of urea in aqueous solution.

Key words aminoacid dimethyl sulfoxide transfer enthalpy

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