

Thermodynamic study of the complexation of p-Isopropylcalix[6]arene with Cs⁺ cation in dimethylsulfoxide-acetonitrile binary media.

ABSTRACT

The complexation reactions between the macrocyclic ionophore, p-isopropylcalix[6]arene and Cs⁺ cation were studied in dimethylsulfoxide-acetonitrile (DMSO-AN) binary non-aqueous solvents at different temperatures using a conductometry method. The conductance data show that the stoichiometry of the (p-isopropylcalix[6]-arene·Cs)⁺ complex in all binary mixed solvents is 1:1. The stability of the complexes is affected by the composition of the binary solvent media and a non-linear behavior was observed for changes of log K(f) of the complex versus the composition of the binary mixed solvents. The thermodynamic parameters (DH[°](c) and DS[°](c)) for formation of (p-isopropyl-calix[6]arene·Cs)⁺ complex were obtained from temperature dependence of the stability constant and the obtained results show that the (p-isopropylcalix[6]arene·Cs)⁺ complex is enthalpy destabilized, but entropy stabilized, and the values of the mentioned parameters are affected strongly by the nature and composition of the binary mixed solvents.

Keyword: Complexion; Conductometry; Dimethylsulfoxide–acetonitrile binary media; P-isopropylcalix-[6]arene; Cs⁺ cation.