
ABSTRACT

The equilibrium constants and thermodynamic parameters for complexation process between titanium (III) cation and meso-octamethylcalix[4]pyrrole were determined by conductivity measurements in acetonitrile–ethanol (AN–EtOH) binary mixture at different temperatures. The conductance data show that the stoichiometry of the (meso-octamethylcalix[4]pyrrole.[Ti(OH)-(H2O)5])2+ complex in all binary mixed solvents is 1:1[I:M]. The stability of the formed complex is sensitive to the solvent composition and a non-linear behavior was observed for changes of log Kf of this complex versus the composition of the binary mixed solvents. The values of thermodynamic parameters (Hc and Sc) for formation of (meso-octamethylcalix[4]pyrrole.[Ti(OH)-(H2O)5])2+ complex were obtained from temperature dependence of the stability constant using van’t Hoff plots. The obtained results show that the formed complex is enthalpy destabilized, but entropy stabilized and a non-monotonic behavior was observed for variations of standard enthalpy and entropy changes versus the composition of the binary mixed solvents.

Keyword: Complexation; Meso-octamethylcalix[4]pyrrole; Titanium (III) cation; Acetonitrile–ethanol binary solvents; Conductometry.