

**A conductometric study of complexation reaction between meso-octamethylcalix[4]pyrrole with titanium cation in acetonitrile-ethanol binary mixtures.**

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)-(H<sub>2</sub>O)<sub>5</sub>])<sub>2</sub><sup>+</sup> 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 K<sub>f</sub> of this complex versus the composition of the binary mixed solvents. The values of thermodynamic parameters (H<sub>c</sub> and S<sub>c</sub>) for formation of (meso-octamethylcalix[4]pyrrole.[Ti(OH)-(H<sub>2</sub>O)<sub>5</sub>])<sub>2</sub><sup>+</sup> 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.