

Physical Properties of a New Type of Molten Electrolytes, $\text{ZnCl}_2\text{-DMSO}_2$

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In the present work some physical properties of binary zinc chloride-dimethylsulfone ($\text{ZnCl}_2\text{-DMSO}_2$) melts were investigated; the phase diagram was determined by Differential Scanning Calorimeter (DSC) and Thermogravimetric Analyzer (TGA) analyses; the electric conductivity was measured using a direct-current computerized method. The conductivities of the melts increased with increasing temperature and DMSO_2 content. There was a maximum of the conductivity at 40 mol% ZnCl_2 ; the conductivity was 0.00423 S/cm at 110 °C. The density of all the melts decreased with increasing temperature and DMSO_2 contents. The equivalent conductivities were given by $\Lambda = \kappa M_{\text{mix}} / \rho$, where M_{mix} is the mean equivalent weight. These equivalent conductivities were fitted by the Arrhenius equation, where the activation energies were 25.2, 34.6, 44.5, 53.7 kJ/mol for 40, 50, 60, 70 mol% ZnCl_2 , respectively.

Key words: Direct-current Computerized Method; Archimedean Technique;
Equivalent Conductivity; Activation Energy.