Conductivities of Room Temperature Molten Salts Containing AlCl₃, Measured by a Computerized Direct Current Method

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The conductivities of the binary room-temperature molten salt systems AlCl₃-N-n-butylpyridinium chloride (BPC), AlCl₃-1-ethyl-3-methylimidazolium chloride (EMIC) and AlCl₃-benzyltriethylammonium chloride (BTEAC) have been measured at different temperatures and compositions by a d.c. four-probes method.

There is a maximum of the conductivity at 50 mol% AlCl₃ in the AlCl₃-BPC and AlCl₃-EMIC systems at 40 to 80°C, their activation energies being relatively low (20.79 and 14.76 kJ/mol, respectively). As to the AlCl₃-BTEAC system, there is an irregular change in the conductivity at 40–70 mol% AlCl₃ in the temperature range 50 to 80°C. The conductivities of the three RTMS are in the order AlCl₃-EMIC > AlCl₃-BPC > AlCl₃-BTEAC, the reason being discussed.

Key words: Conductivity; Room-temperature Molten Salts; Activation Energy; Direct Current Method; Computerized Measurement System.