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THE ELECTRICAL CONDUCTIVITY OF AQUEOUS SOLUTIONS OF CALCIUM CHLORIDE

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The Electrical Conductivity of Aqueous Solutions of Calcium Chloride

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Abstract

Values are reported at 25°C for solutions ranging from 0.39 to 4.06 molar.

The interpretation of the transport properties of electrolytic solutions requires data on the conductivity, transference number, diffusion coefficient, and activity coefficient, as well as the density and viscosity. Solutions of calcium chloride are unusual in that data are available to 6 molar for the density, viscosity, and diffusion coefficient, to 2.6 molar for the transference number, and to 10 molal for the activity coefficient. However, the electrical conductivity, one of the easier properties to measure, is available only in dilute solutions[1,2] except for the data of Kondrat'ev and Nikich,[3] which go up to 1 molal.

To fill this gap, the conductivities of calcium chloride solutions are reported in table 1. The concentrations were measured gravimetrically by precipitation as the oxalate with subsequent conversion to the carbonate at 500°C. The conductivities of the solutions were measured with an alternating-circuit bridge, the cell being calibrated with potassium chloride solutions.

Table 1. Conductivity of aqueous solutions of calcium chloride at 25°C.

c	κ	c	κ
mole/l	$(\text{ohm-cm})^{-1}$	mole/l	$(\text{ohm-cm})^{-1}$
0.3857	0.0617	2.754	0.2034
0.965	0.1284	3.009	0.2002
1.488	0.1704	3.046	0.2005
1.913	0.1902	3.830	0.1766
2.406	0.2023	4.058	0.1672

Acknowledgment

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3. V. P. Kondrat'ev and V. I. Nikich. "Udel'naya elektroprovodnost' vodnykh rastvorov khloridov shchelochnozemel'mykh metallov pri vysokikh temperaturakh." Zhurnal Fizicheskoĭ Khimii, 37, 100-105 (1963).

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