

Behaviour of 2, 4 Dihydroxy Benzoic Acid in Aqueous Solution

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Detailed studies on coloured chelates of 2,4 dihydroxy benzoic acid by spectrophotometric and a.c. polarography methods with regard to composition and stability for various metal ions have been studied and it has been observed that the ratio metal : 2,4 dihydroxy benzoic acid was not in a stoichiometric proportion, when the solutions of the reagent were sufficiently concentrated. The composition corresponding to true stoichiometric ratios were however obtained when very dilute solutions were used. 2,4 dihydroxy benzoic acid appears to be as a colloidal electrolyte, as has been noted in the case of several other reagents used as chelating agents¹.

EXPERIMENTAL RESULTS AND DISCUSSION

The electrical conductance of a series of solutions of 2,4 dihydroxy benzoic acid was measured at different dilutions at 31°. The specific conductance of 2,4 dihydroxy benzoic acid was also determined at six different temperatures. From the curves in fig. 1, the

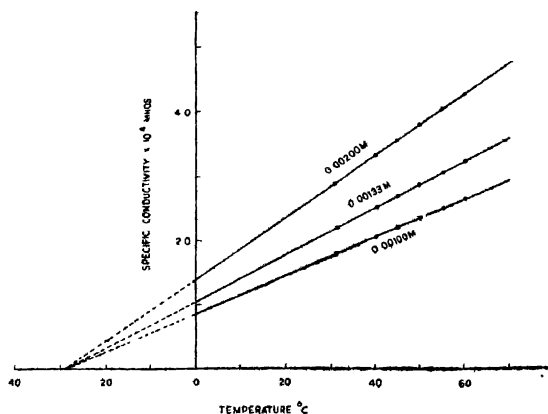


FIG 1 CONDUCTANCE OF 2,4 DIHYDROXY BENZOIC ACID AT DIFF TEMPS

temperature of zero conductance has been extrapolated to be -29° . The temperature coefficient per degree centigrade per hundred of the conductance at 35° are recorded in Table 1.

1. M. K. Gadia and R. S. Rai, *J. Indian Chem. Soc.*, 1970, **47**, 813, 1165.

TABLE I

Concentration (<i>M</i>)	Specific con- ductance at 35° (from graph) mhos $\times 10^4$.	Temperature coefficient per degree centigrade	Temperature coefficient per °C per hundred of the conductance.
0.00200	3.10	0.45	1.453
0.00133	2.35	0.37	1.574
0.00100	1.93	0.29	1.499

It is interesting to note that the nature of the curve plotted between (concentration) and equivalent conductance is similar to the curves of colloidal electrolytes recorded by McBain and is not linear. If the solutions of 2,4 dihydroxy benzoic acid behave as true electrolyte, the curve would have been linear and the Debye-Hückel equation would have been applicable. Further it has been found that the temperature of zero conductance lies at -29° and the temperature coefficient per degree centigrade per hundred of the conductance at 35° ranges between 1.453 and 1.574. These results go to establish the behaviour of 2,4 dihydroxy benzoic acid as a colloidal electrolyte. The observations are in close conformity with the findings of Prakash and Co-workers²⁻³, who described that in general, the temperature of zero conductance of true electrolytes lies at -40° ; whereas in the case of colloidal systems, this temperature ranges between -15° and -35° . It was also found by these workers that usually the temperature coefficient per degree per hundred of the conductance at 35° , in colloidal systems is found to be below 2.0.

Thus it is concluded that 2,4 dihydroxy benzoic acid exhibits the behaviour of a colloidal electrolyte. Hence it is likely, that during the determination of composition of chelate compounds the colloidal characteristics of the reagent plays a significant part, due to which deviations from the true stoichiometry are often arrived at.

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2. S. P. Mushran and S. Prakash, *J. Phys. Chem.*, 1946, **50**, 251.
3. T. N. Shivapuri and S. Prakash, *Current Science* (India), 1949, **18**, 403.