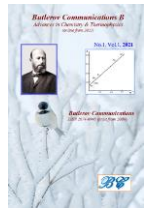
BUTLEROV HERITAGE

Butlerov Communications B
Advances in Chemistry & Thermophysics
ISSN 2074-0948 (print)

2021. Vol.1, No.1, Id.3.
Journal Homepage: https://b-journal.butlerov.com/



Thematic section: Physicochemical Research.
Subsection: Technology of Electrochemical Processes.

Full Paper

The Reference Object Identifier – ROI-jbc-B/21-1-1-3
The Digital Object Identifier – DOI: 10.37952/ROI-jbc-B/21-1-1-3
Received 11 February 2021; Accepted 13 February 2021

Investigation of temperature effect on the electrical conductivity of alcohol solutions of sodium phenolates

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Keywords: alcohol solutions of sodium phenolates, specific and equivalent electrical conductivites, temperature, Arrhenius equation.

Abstract

We have previously studied the electrical conductivity of inorganic salts, sodium and potassium alcoholates in a number of alcohols (ethanol, 2-propanol and 1-butanol) at room and elevated temperatures. It was found that the investigated solutions are weak electrolytes and an increase in their temperature leads to an increase in electrical conductivity due to an increase in the mobility of salt ions in an alcohol medium. To study the temperature dependence of the electrical conductivity of aqueous electrolyte solutions, we developed an approach based on studying the effect of temperature on the equivalent electrical conductivity of solutions at infinite dilution λ_∞. With this approach was investigated dependence of the limiting equivalent conductivity from temperature for aqueous solutions inorganic salts (nitrates, acetates and phosphates), carboxylic acids and amino acids, a number of inorganic salts (calcium chloride and nitrate, cadmium, lithium and potassium iodides, chloride, iodide and ammonium nitrate, silver nitrate and sodium bromide) in ethyl alcohol, as well as of solutions ethylates, propylates, isopropylates of potassium and sodium in the corresponding alcohols. It was found that for these solutions the dependence $\lambda_\infty(T)$ is described by the exponential Arrhenius equation $\lambda_\infty = A \cdot \exp(-E/(RT))$. This article investigates the effect of the nature of alcohols (ethanol, propanol-2 and butanol-1), salts (*ortho*-cresolate, *meta*-cresolate, *para*-cresolate, phenolate, timolate, nipaginate, resorcinate and sodium nipazolate) and temperature on the limiting equivalent conductivity solutions of sodium phenolates. It is shown that the values of λ_∞ decrease for solutions of salts in ethanol, propanol-2, and butanol-1, which is associated with a decrease in the dielectric constant of alcohols in the above series. It is shown that the Arrhenius equation can describe the experimental

data $\lambda_\infty(T)$ for solutions of sodium phenolates in ethanol, propanol-2, and butanol-1 in the temperature range 293-333 K.

For citation: Vera A. Petrukhina, Pavel I. Fedorov, Yulia Yu. Pylchikova, Anastasia A. Ivanova, Natalia I. Ilyina, Nikolay I. Kol'tsov. Investigation of temperature effect on the electrical conductivity of alcohol solutions of sodium phenolates. *Butlerov Communications B*. **2021**. Vol.1. No.1. Id.3. DOI: 10.37952/ROI-jbc-B/21-1-1-3

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