Full Paper _____ *Thematic Section:* Chemical Equilibrium.
Registration Code of Publication: 11-27-14-74 *Subsection:* Inorganic Chemistry.
Publication is available for discussion in the framework of the on-line Internet conference "*Butlerov readings*".
http://butlerov.com/readings/
Contributed: May 12, 2011.

The comparison of dielectric characteristics of aqueous and mixed solutions of nitrate potassium and sodium in a microwave range

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Keywords: *dielectric spectroscopy; solutions of nitrate potassium and sodium; dielectric permittivity; hydration; structure of water.*

Abstract

Complex dielectric permittivity of mixed water-formamide salt solutions of potassium and sodium nitrates have been studied in 1-10 moll % of formamide and 1 moll of salt per 1 kg of pure water at (283; 313K) temperature intervals at a frequency of 10.2-25 GHz. Concentration changes of dielectric parameters at all temperatures were found. According to enthalpy changes of dielectric relaxation, mixed solutions act in the same way as water solutions, i.e. no difference between the influence of cations of potassium and sodium on water structure was revealed.

A comparable influence of ions and formamide molecules were observed on the original hydrogen bond network, i.e. the studied mixed systems constitute a typical example of multi-component systems with hydrophilic hydration. In mixed solutions the hydration contributions of formamide, temperature, and an ion in changes of the structure of the initial network of water are comparable.