THERMODYNAMIC PROPERTIES OF SODIUM AND POTASSIUM METHANESULFONATES

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Investigation of the properties of methansulfonic acid's salt and systems based on them is of interest, first of all, from the fundamental point of view. Information on properties of these salts in the literature is given partially, despite of widely using of methansulfonic acid and its inorganic derivatives in various fields of industry. From a practical point of view, investigation of the properties of sodium and potassium methanesulfonates is interesting because of geochemistry problems. Methansulfonic acid is a product of oxidation of dimethyl sulfide by oxygen, which is a product of phytoplankton activity. Not so long ago, sodium and potassium methanesulfonates were found in the ice cores of Antarctica. Knowledge of the properties and composition of ice cores could be applied to reconstruct the climatic changes or ocean composition during the cores formation, - this might be used to solve the problems of geothermobarometry.

The aim of this work was to study the thermodynamic properties of methanesulfonic acid salts - CH_3SO_2ONa and CH_3SO_2OK. In this study measurements of isobaric heat capacities of the salts were coundacted by differential scanning calorimetry (DSC) in a wide range of temperatures. The thermal effect of dissolving salts in water at 298.15 K was determined by dissolution calorimetry method. Temperature dependences of the thermodynamic functions - isobaric heat capacity, entropy, enthalpy - were calculated in the program "CpFit" (http://td.chem.msu.ru/develop/cpfit/) on the basis of DSC experimental data. The linear combination of Einstein-Planck functions was applied in the approximation. Standard enthalpy of salt's formation at 298.15 K was calculated on the basis of dissolution calorimetry data.

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1. Gernon M. D., Wu M. Buzsta, T. Janney. *Environmental Benefits of Methanesulfonic Acid. Comparative Properties and Advantages.* Green Chemistry, 1999, 1.
2. Baker S. C., Kelly D. P., Murrell J. C. Microbial *Degradation of Methanesulphonic Acid: A Missing Link in the Biogeochemical Sulphur Cycle.* Nature, 1991, 350.
3. Hatakeyama S., Okuda M., Akimoto H. *Formation of Sulfur Dioxide and Methanesulfonic Acid in the Photooxidation of Dimethyl Sulfide in the Air.* Geophysical Research Letters, 1982, 9.