THERMODYNAMIC PROPERTIES OF COPPER AND ZINC METHANESULFONATES

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Methanesulfonic acid (CH_3SO_2OH) is the simplest representative of sulfonic acid's. Such properties as relatively low corrosiveness, high thermal stability, low toxicity and the possibility of biological decomposition, as well as high solubility of salts allow applying of this acid as a solvent or reagent. In addition, methanesulfonic acid is the main product of the dimethyl disulfide photochemical oxidation in the atmosphere and therefore in the environment's biogeochemical cycle. Thus, methanesulfonates of transition metals could be applied in the chemical industry as coatings obtained by various electroplating methods, and also as a catalysts. Due to the high density of zinc-containing water solutions of salts, zinc methanesulfonate might be applied as a well-killing fluid.

The aim of this work was to study the thermodynamic properties of methanesulfonic acid salts $Cu(SO_3CH_3)_2{\cdot}4H_2O$ and $Zn(SO_3CH_3)_2{\cdot}4H_2O$. 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[1] on the basis of DSC experimental data. The linear combination of Einstein-Planck functions was applied in the approximation. Standard enthalpy of salts formation at 298.15 K was calculate on the basis of dissolution calorimetry data.

[1] *http://td.chem.msu.ru/develop/cpfit/*