



Electric Current Generation in the System Polyelectrolyte Gel of V_2O_5 – Solution

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Extending the list of the physical and chemical processes applicable for making electric current accumulators allows expanding the sources of raw material for the production of this category of goods. Vanadium is a promising alternative to lithium. In this paper, we describe the generation of an electric current in the dissolution of gels based on vanadium (V) oxide. It was shown that an electrochemical cell having the properties of a battery of electric energy can be produced by using decavanadic acid gel and hydroxide solution. In particular, it was theoretically established that a sample of a gel that passed into a collapsed state under the influence of a constant electric current has an ability to generate an electric current in a closed galvanic circuit after an external current source was disconnected. The gel was grown from an aqueous solution of vanadium (V) oxide. The dependence of the amperage in the external circuit on time is shown, the starting value of the discharge current J_0 is indicated. During the experiments, the generation of current was also studied by placing the gel sample into the solutions of other substances, as well as into the distilled water. It was found that in acid solutions and pure water, the efficiency of the current generation is very low (the current values obtained do not exceed the sensitivity limit of the microammeter). The generation of current becomes effective only by placing the gel in an alkali solution.

On this stage of the research, it can be stated that the nature of the current generation in the system under the consideration essentially depends on the nature of the chemical compounds that transfer the gel substance into the liquid phase. This makes it possible to quantitatively describe the effects, which are inverse to electrolysis, and to answer the questions regarding the applicability limitations of electrolytic dissociation theory, since in this case there is the possibility for direct quantitative comparison of the current strength associated with the motion of ions and experimental data.

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