

## **USING THE METHOD OF RESERVOIR DYNAMICS IN MODELLING OF WATER-ROCK INTERACTIONS**

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In modern time one of the most important direction of geoscience becomes study of interaction between solids and water and its ecological consequences. Mathematical methods for prediction and quantification of chemical processes at the solid-water interface is of much importance. In our research the method of reservoir dynamics was used to describe the processes of leaching in tailings of nepheline concentrate. The method is based on minimization of thermodynamic potentials. Model of the object is represented by a series of reservoirs connected with each other by flows of substance and energy. Each reservoir represents a selected stage in the whole process of leaching and the local equilibrium is sequentially calculated for physico-chemical conditions accepted in the reservoirs. Physico-chemical parameters of the model environment are taken into account through assigned degree of interaction between rock and water solution. The modelling enabled to reveal transformation of rocks at different horizons of the tailings and to assess changes of Eh, pH, ionic composition of water and energetic characteristics of the system. Results of the modelling indicate that under conditions of a closed system in lower horizons of the tailings formation of new Fe, Al (hydro)oxides and clay minerals were occurred. New-formed minerals can significantly decrease rock permeability resulting to change of hydrodynamic conditions in the tailings and to a threat for environment. Different scenarios of modelling allowed to substantiate the most suitable physico-chemical conditions in the tailings ensuring a minimal negative impact on surrounding ecosystems.