

THE STUDY OF INTERACTION OF COPPER AND NICKEL BEARING SOLUTIONS WITH CALCIUM CARBONATE

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The uncontrolled sewage of tailings and overburden rock dumps containing non-ferrous metal and iron sulphides are sources of pollution for natural reservoirs. In order to optimize the deep purification of natural water from nickel and copper ions a computer simulation of the process of interaction between diluted solutions and calcium carbonates in systems both open and closed to the atmospheric impact has been performed and a series of laboratory experiments set. Comparison of the results of the mathematical modelling and the experimental data has shown that by employing carbonate flour it is possible to attain a significant degree of purification of natural water from heavy metals without a negative effect on the living organisms. On the carbonate grain-solution interface a local equilibrium is attained. Equilibrium in the solution bulk sets in after 20-30 minutes and is controlled by diffusion rate. Since in a closed system the depth of purification is higher than in an open one, it is worthwhile to introduce carbonate grains in the precipitate until equilibrium is attained in the entire bulk of the natural reservoir. Computer modelling allowed to get an insight into the physico-chemical processes occurring as the result of interaction between copper and nickel sulphates and carbonates, to determine the conditions of bringing out the system to the stationary state in both open and closed atmosphere conditions; to reveal the ionic and mineral composition; to determine the theoretically feasible depth of purification and to compare the theoretical and experimental data.