

TREATMENT OF WATER CONTAMINATED WITH Ni²⁺ IONS BY MAGNETOACTIVE SORBENTS

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The Institute of Organic Synthesis and Coalchemistry of the Republic of Kazakhstan conducts work on the development of a technology for the production of new magnetoactive materials based on humates and their polycomplexes with natural and synthetic polymers in order to create highly efficient sorbents. Adding magnetic properties to sorbents can provide a significant increase in the efficiency of their use.

To obtain a magnetic sorbent by coprecipitation of solutions of ferrous and ferric salts by the Elmore method (in an equivalent ratio) in the presence of humate, a reaction mixture for the production of magnetite was added to the hydrosuspension of humate with polyvinyl alcohol almost simultaneously and was not allowed to precipitate. Sorption capacity of magnetically controlled sorbents on the basis of polycomplexes with magnetite was studied in the context of their absorption of Ni (II) ions from model solutions of salts of concentration 0.01, 0.02 and 0.04N. Work was carried out to study the effect of the composition of the initial mixtures of polyvinyl alcohol with sodium humate and the pH on the sorption of Ni²⁺ ions, this polycomplex sorbs 15-20% of nickel, the most optimal pH being 7-9. The sorption capacity of the sorbent was no more than 15%. Then we studied the sorption of the developed sorbent composed of polyvinyl alcohol, sodium humate and magnetic fluid.

The sorbents absorbed 81.8% of nickel at the ratio of the polycomplex to the magnetic fluid of 8:2 and pH=5, and the highest value of 82.6% was achieved at pH=9. Sorption is better for nickel with a low salt concentration of 0.01N. Low sorption values of magnetically controlled sorbents are caused by formation of salt bonds between macromolecules of humate, polymer and magnetite. Studies have shown that the synthesis conditions, the component ratio, the pH of the medium, the concentration are crucial for subsequent modification, which changes the sorption properties of the functional derivatives of humic acids with a magnetic fluid. The scientific results will contribute to the widening of existing knowledge about sorption methods and the creation of new sorbents with improved technological characteristics that determine their use as sorbents.

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