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Yu.M. Fedenko, PhD
I.O. Blazhchuk, student
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine

DETERMINATION OF OPTIMAL DOSE OF BENTONITE FOR SORPTION ZN(II)

In conditions of vigorous anthropogenic activity, heavy metal pollution of natural waters has become one of the acute environmental problems. The main sources of heavy metals in the environment are enterprises of ferrous and non-ferrous metallurgy, galvanic shops, quarries and mines for the extraction of polymetallic ores, etc.

Permissible concentration limit (MPC) of heavy metals, for example zinc, in the water of reservoirs is set at 0.1 mg/l, and nickel – 0.02 mg/l [1].

The danger of heavy metals is that they tend to accumulate in living organisms, causing carcinogenic and mutagenic impact on living organisms. The most promising method for treating wastewater containing heavy metals is adsorption the method, which is characterized by ease of implementation and high efficiency with optimal selection of the used sorbents. To reduce economic costs of conducting water treatment processes, the issue of search and research of sorbents with high sorption capacity and low cost. Natural sorbents, such as zeolites, coals, bottom sediments and clay minerals. High clay cation exchange capacity minerals, in particular montmorillonite, due to two factors:

1) an increase in the interlayer space of the structural cell in contact with water and other polar liquids;

2) the ability to exchange cations to substitution with cations of other metals [2].

To study the dependence of the efficiency of extraction of Zn^{2+} from the dose of the sorbent in 5 conical flasks, bentonite weights were added in masses of 0.1, 0.5, 1, 2, 5 g. Each of the flasks was poured into 100 cc of zinc solution at a concentration of 100 mg/dm^3. pH of each solution was determined with standard solutions of HCl and NaOH (0,1 M).

Figure shows the dependence of removal percentage of Zn(II) ions from dosage of bentonite clays.

According to the data of Figure 1, the maximum degree of extraction of Zn^{2+} reaches 99 % at pH 11. This, in our opinion, is due to the fact that for such values of pH zinc falls in solution in the form of hydroxide, and bentonite in no way affects its efficiency withdrawal.

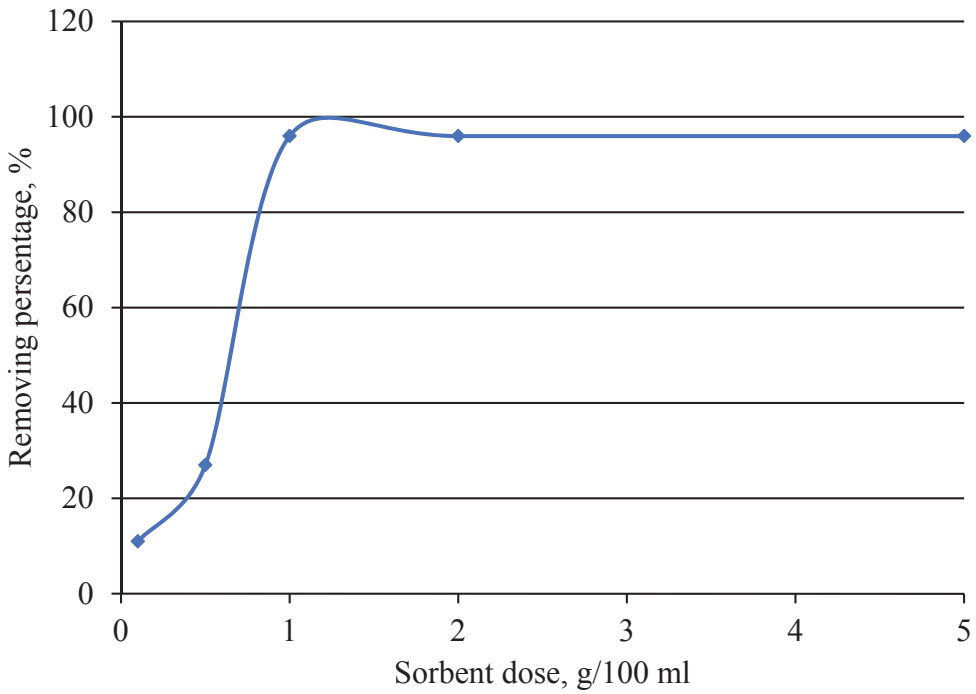

Figure – The dependence of removal percentage of Zn(II) ions from dosage of bentonite clays

However, at pH 5, the degree of extraction of zinc from model solutions is 96 %. Taking into account that for such values of pH Zn(II) exists in the solution even in the form of ions, it is logical to assert that these ions settle on the surface of the functional groups of bentonites.

References

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