Şəkil 2. $(3CuO \cdot B_2O_3)_{1-x}$ - $(ZnO)_x$ sistem ərintilərində istilik e.h.q.-nin temperaturdan asılılığı.

1- $3CuO \cdot B_2O_3$; 2-95.0 mol%$3CuO \cdot B_2O_3$ + 5.0 mol% ZnO;

3-90.0 mol %$3CuO \cdot B_2O_3$ + 10.0 mol% ZnO;

4-85.0 mol%$3CuO \cdot B_2O_3$ + 15.0 mol% ZnO;

5-80.0 mol%$3CuO \cdot B_2O_3$ + 20.0 mol% ZnO

Temperaturun daha da artması ilə bütün ərintilər üçün α-nın qiyməti tədricən azalır, lakin bu ərintilərdə α-nın azalma sürəti eyni deyil.T=300-960ºC temperatur diapazonunda ekstrapolyasiya metodundan istifadə etməklə müəyyən edilmişdir ki, ərintilər yarımkeçirici xassələrə malik kompensasiya olunmuş maddələrdir. Beləliklə, $3CuO \cdot B_2O_3$–ZnO sisteminin ərintilərinin α= $f(10^3/T)$ temperaturdan asılılığının öyrənilməsi bu ərintilərin yarımkeçirici xassələrə (T=300÷960K) malik olduğunu və kompensasiya olunmuş materiallara aid olduğunu təsdiq edir.

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STUDY OF PHASE EQUILIBRIA AND ELECTROPHYSICAL PROPERTIES OF ALLOYSIN THE 3CuO·B₂O₃ – ZnO SYSTEM

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Summary

The paper presents the results of the studies of the interaction of the copper borate with zinc oxide and some physical properties of the intermediate samples. It was established that studied system is quasi-binary. With a 1:1 ratio of the initial components, a congruently melted at 980 ^{0}C compound $3CuO \cdot B_2O_3 \cdot ZnO$ is formed in the system. Since this compound is a glass former, the system is characterized by the formation of a wide area of glasses. The article also presents studies of the temperature dependence of thermo-EMF of alloys containing x=0.0-20.0 mol% of the ZnO in the T = 300-960ºC temperature range. Using the extrapolation method, it was established that the compositions are compensated alloys with semiconductor properties. Within the experimental error, the thermo-EMF value is close to one obtained from the temperature dependence of electrical conductivity.

SOLUTIONS BY NOVEL SYNTHETIC COPOLYMER

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Although it is well recognized that water is an extremely precious natural resource for people and other living things, water pollution is today seen as a severe issue that affects the entire world. [1,2].Inorganic pollutants—heavy metals in particular—are distinct from other types of pollution[3].Because of its extreme toxicity and incapacity to be metabolized and removed by nature, this class of inorganic pollutants is constantly under scrutiny[4].This set of elements' primary

characteristic is their severe toxicity, even at ppm levels. Nickel is one of the metals in this category as well. Since nickel is used so extensively, industrial waste and wastewater containing nickel-containing goods cause a large discharge of nickel into the aquatic environment[5].

Recent years have seen notable advancements in the adsorption method's ability to remove nickel ions from water. Nonetheless, the development of novel sorbents that can efficiently extract nickel from a solution at either a low or high concentration in a short amount of time remains necessary.

The purpose of the presented work is to study the sorption of Ni(II) ions from its aqueous solutions by a polymer chelating sorbent based on a copolymer of maleic anhydride and 1,4-bis [2-(prop -1-enil) fenoksi] butane with styrene and modify this sorbent by novel thiourea derivative for the increasing its sorption capacity. The characteristics of sorption, especially pH, time, ionic strength, initial concentration of metal ion were studied.The desorption process was also investigated and the optimal eluent was determined. Several adsorption isotherms have been studied.

Sorption experiments

Sorption studies of Ni (II) ions were carried out at room temperature. For each experiment, 2 ml of metal ion solution of known concentration ($5 \cdot 10^{-3}$ mol/L) was added to 50 ml conical flasks. 30 mg of sorbent and appropriate pH were added to each flask. The pH level of the solutions was monitored using a pH-121 pH-meter. After keeping the obtained mixture for 24 hours, the liquid phase was separated from the solid phase by filter paper.

Then 1 ml of sample was taken from each flask and diluted with a buffer solution of pH-5. The final concentration of Ni (II) ions was 2,2′,2″,2‴-{(1,1-Dioxo-2,1λ6-benzoxathiole -3,3(1H)-diyl)bis[(6-hydroxy-5-methyl-3,1-phenylene)methylenenitrilo]}tetraacetic acid reagent (R) was measured using KFK-3 photoelectrocolorimeter at wavelength $\lambda=580$ nm .

Effect of pH on the sorption of Ni (II).

To conduct the experiment, 30 mg of sorbent was weighed and collected in separate containers, then 2 ml of 10^{-2} M metal ion solution and 18 ml of appropriate pH were added to it and kept for 24 hours. After 24 hours , the solution was filtered through a filter paper to separate solid particles and measured at a wavelength of $\lambda=580$ nm using a KFK-3 spectrophotometer. The effect of the pH of the solution on the sorption of nickel is shown in the graph below.
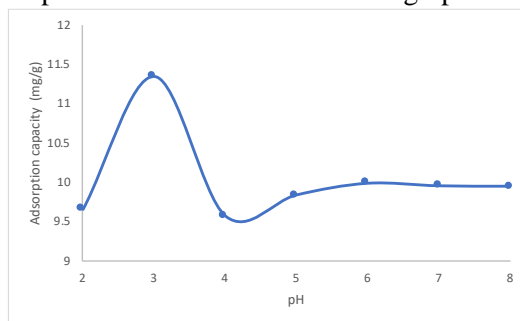
Effect of time on the sorption of metal ions

In order to study the dependence of sorption on time, 30 mg of sorbent was taken and 2 ml of 10^{-2} M metal solution was added to it, and then 18 ml of pH 3 was added and the rate of sorption of metal ions in the solution was studied for 30-270 minutes. The result of the experiment is given in the graph below. As can be seen from the graph, after 60 minutes, the sorption has already stabilized and reached the equilibrium state.
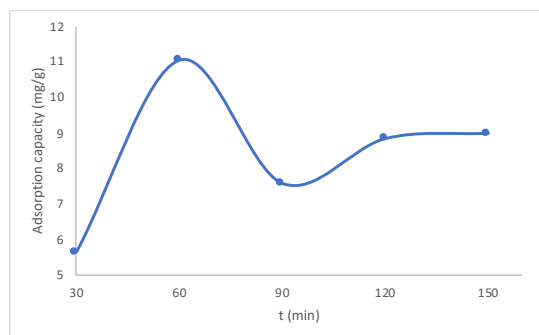
Desorption process.

This work also includes the study of the opposite process - desorption. It is an important task to have the necessary eluents to adsorb the metal ion. In our article, this process is carried out using different inorganic acids of the same concentration, in particular, 0.5 mol/L solutions of HNO_3, HCl, H_2SO_4 and CH_3COOH acids. The research results showed that the maximum desorption capacity on Ni(II) ions is 0.5 mol/L HNO_3 solution.

Effect of initial concentration of Ni(III) ions on adsorption capacity.

During the experiment, the effect of the concentration of primary metal ions on the degree of adsorption by the synthesized sorbent was studied. For this purpose, the concentration range of Ni (II) ions from 2×10^{-4} mol/L to 8×10^{-3} mol/L was used. For this purpose, 30 mg of sorbent was weighed, and an appropriate volume of metal ion solution and pH 3.0 was added. After 60 minutes, optical densities of homogenous solutions in KFK-3 were measured at $\lambda = 590$ nm with pH 6.0 buffer solution. The result of the experiment is given in the table below.
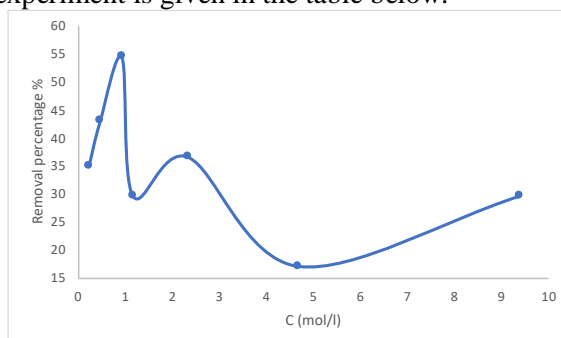
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YENİSİNETİK SOPOLİMER İLƏ SULU MƏHLULLARDAN Ni(II) İONUNUN ADSORPSİYON TƏDQİQİ

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Xülasə

Tədqiq olunmuş iş Ni(II) ionlarının malein anhidrid stirol sopolimeri əsasında sintetik sorbent vasitəsilə adsorbsiyasının öyrənilməsinə həsr edilmişdir. İş zamanı sorbsiya prosesinə təsir edən müxtəlif parametrlər - pH-ın təsiri, təmas vaxtı və ilkin metal ionlarının konsentrasiyası tədqiq edilmişdir. Müəyyən edilmişdir ki, maksimum sorbsiya qabiliyyəti pH=3-də müşahidə olunur və 11.5 mq/q-a bərabərdir.Sorbsiya prosesi 60 dəqiqədə tamamlanır.Aparılmı tədqiqatda həmçinin desorbsiya tədqiqatları daxildir və müəyyən olunmuşdur ki, 0,5 mol/l HNO3 məhlulu Ni(II) ionları üzərində ən yüksək desorbsiya qabiliyyətini göstərmişdir.