PURIFICATION OF CHROMIUM CONTAINING WASTE WATER BY MAGNETIC SORBENTS

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Introduction

Chromium (III) compounds, especially chromium (VI), are toxic to humans and animals, therefore the development of new methods and technologies for wastewater treatment is very relevant.

There are many effective technologies for purification of chrome-containing wastewater from chromium cations: reagent, electrochemical, membrane. The application of sorption technologies is promising. In recent years, adsorption has shown promising and effective results in both drinking water and wastewater treatment technologies in the industry. A number of adsorbents have been synthesized and applied to the treatment of pollutants, such as metal cations, dyes, and pharmaceutical products in solutions.

However, these types of adsorbents have one common drawback - they require a long release from the solution, which increases operating costs. To prevent this problem, some researchers offer magnetic materials that can be promising adsorbents that can be easily separated from the solution using a magnetic field. Magnetic adsorbents (MA) can provide fast and efficient suspension separation.

environmental protection.

Experimental Section

The corresponding sulphates were used for the synthesis of magnetic sorbents. The $MeFe_2O_4$ nanoparticles (Me = Fe, Mn, Co, and Ni) were prepared by chemical precipitation from aqueous solution of ferric(II) sulphate, manganese(II) sulphate, nickel(II) sulphate, cobalt(II) sulphate by the method described in detail in [6].

Depending on the degree of sorption on the mass of adsorbents are of different nature. For magnetite, manganese ferrite and chromium, they are almost linear in nature and differ significantly in the maximum degree of extraction. When using magnetite, the maximum sorption capture was 70%, chromium ferrite - 90%, nickel ferrite - almost 100%. For cobalt and nickel ferrite, the course of the curve is logarithmic. In both experiments, the degree of trapping increased with increasing initial concentration of the solution.

When using cobalt ferrite, the maximum sorption capture was 72%. As the initial concentration of the solution increases, the degree of trapping increases. The use of ferrite of Ni leads to a degree of purification of 99.8%.

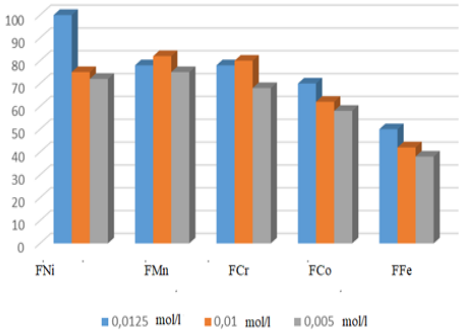

Figure 2. Histogram of the distribution of the degree of purification of the adsorbent type (mass of adsorbent 0.5 g / 50 ml

Synthesized magnetically controlled sorbents based on cobalt, nickel, manganese, chromium, magnetite ferrites have high sorption capacity. It has been found that chromium sorption occurs at a faster rate: the equilibrium of the adsorption process is reached in a maximum of 10 minutes.

It is shown in the paper that the use of magnetically controlled sorbents makes it possible to purify chromium (III) wastewater with high efficiency.

The results obtained may form the basis for further research into the use of the latest adsorbents.

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