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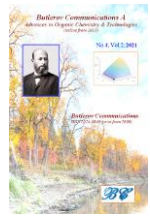

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Removal chromium(VI) ions from wastewater by adsorption on natural mineral calcite

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Abstract

Heavy metals in wastewater have a large impact on the environment due to their toxicity. For the removal of heavy metals from wastewater, the most suitable is the adsorption process, due to its low cost, availability, ease of use, efficiency. In this work, the process of adsorption of chromium(IV) ions using natural mineral calcite is investigated. The structure and morphology of a sample of a natural mineral have been studied by scanning electron microscopy and XRD analysis. It is shown that a natural mineral used as an adsorbent contains 13% silica and 87% calcite. For the study of the process of chromium(VI) ions adsorption on a natural mineral containing calcite, a working solution of potassium dichromate with a concentration of 0.01 g/l was used. The determination of the adsorption capacity was carried out under dynamic conditions with stirring for 30 minutes at a frequency of 500 rpm. The chromium(VI) ions concentration was determined using a photometric method based on the reaction of dichromate ions with diphenylcarbazide in an acidic medium with form to the violet-coloured compound. The study of the calcination temperature effect to the adsorption capacity of the natural mineral was carried out using a model chromium-containing solution. The dependence of the sorption capacity and the degree of chromium extraction on the calcination temperature of the natural mineral has been studied. An increase in the calcination temperature leads to an increase in the sorption capacity with respect to chromium ions, which is associated with the removal of bound water and an increase in porosity.

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