



COMPARATIVE STUDY OF SORPTION OF Ni (II) WITH MALEIC ANHYDRIDE STYRENE-BASED SYNTHETIC SORBENT THAT FUNCTIONALIZED WITH N,N'-DIISOPROPYL THIOUREA

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In this day and age, water pollution is considered a dangerous problem and beside this it is a serious global problem. It is known that water is an extremely valuable natural resource for both humans and other living creatures. There are several causes and sources of water pollution, for example, inorganic pollutants [1], especially heavy metals, play an important role. Among heavy metals, nickel differs from others with its toxicity [2-3]

In recent years, significant progress has been made in the purification of nickel ions from water using the adsorption process. However, there is still a need for the synthesis of new sorbents that are more effective - in a short time, with a high percentage of low or high concentration, and to study their properties.

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 2-(4-aminobenzenesulfamido)-thiazole with styrene. Beside this for studying the development possibility of sorption capacity of novel sorbent, the obtained copolymer was modified with N, N'-diisopropyl thiourea and the properties of the sorption were studied in both cases. The properties of sorption, especially pH, time, ionic strength, initial concentration of metal ions were comparatively studied. The desorption process was also investigated and the optimal eluent was determined.

It was determined that the maximum sorption capacity for both the primary copolymer and the modified sorbent is observed at pH=3. The sorption capacity is equal to 18.5 mg/g for the primary copolymer and 23.24 mg/g for the modified sorbent, respectively. The effect of time on the sorption process was also studied and it was determined that after 60 minutes, the sorption stabilized and reached an equilibrium state. The effect of ionic strength on the rate of Ni(II) ion capture was studied. For these purposes, 2 mol/L potassium chloride solution was used. Studies have shown that the presence of K⁺ and Cl⁻ ions in the range $\mu = (0.2 - 1.4)$ mol/L has a negligible effect on metal ion sorption. To study the desorption process, it is carried out using 0.5 mol/L solutions of various inorganic acids, especially HNO₃, HCl, H₂SO₄ and CH₃COOH acids. The research results showed that the maximum desorption capacity on Ni(II) ions is 0.5 mol/L HNO₃ solution.

Literature

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