عنوان مقاله:

Studying effects of ion exchange resin structure and functional groups on Re(VII) adsorption onto Purolite A170 and Dowex 21K

محل انتشار:

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خلاصه مقاله:

The effects of the functional groups and structures of two different resins, weak base/macroporous and strong base/gel type, Purolite A170 and Dowex 21K on the adsorption properties of Re(VII) ions were investigated experimentally and described by the isotherm, kinetic, and thermodynamic modeling. In this regard, four widely used adsorption isotherm models including Langmuir, Freundlich, Temkin, and Dubinin-Radushkevich (D-R) were subjected to the sorption data in order to describe the reactions involved. Evaluating the correlation coefficients showed that the Freundlich and D-R isotherm models provided the best fit. The Langmuir isotherm capacities (qm) indicated that the perrhenate ion (ReO4-) adsorption was higher for the weak base/macroporous type resin rather than the others (166.67 mg/g and 142.86 mg/g, respectively). Moreover, the results of the EDX studies were in agreement with the previous results. Furthermore, the adsorption kinetics was demonstrated through fitting the data into different mechanisms, among which the pseudo-second-order mechanism was found to be successful for both resins; however, in the case of Dowex 21K, the rate of perrhenate ion uptake was more rapid than that for Purolite A170. Evaluation of the thermodynamic parameters also showed that the reaction mechanism was different for each case and that the adsorption of rhenium on Dowex 21K became more feasible with increase in temperature due to negative values for ΔH.

کلمات کلیدی:

rhenium, Purolite A170, Dowex 21K, Adsorption mechanism