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EQUILIBRIUM AND KINETICS STUDY OF NITRATE REMOVAL FROM WATER BY PUROLITE A520-E RESIN

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Abstract

Equilibrium and kinetics of nitrate removal from aqueous solutions of pH = 6.8 were investigated using the strong base anion exchange resin (Purolite A-520E) in the batch method. The experimental equilibrium data were analyzed by means of the Langmuir, Freundlich and Dubinin-Radushkevich sorption isotherm models. The Langmuir model describes sorption isotherm of nitrates with high correlation coefficients and better than Dubinin-Radushkevich and Freundlich models. The effect of temperature on the nitrates ion exchange process onto resin was also investigated, and various thermodynamic parameters, such as ΔG , ΔH and ΔS have been calculated. The thermodynamic parameters indicate the spontaneous and endothermic nature of the ion exchange process. The experimental curves $q - t$ have been confronted with three kinetic models, and the corresponding kinetic constants have been identified. The best fit of experimental sorption data was obtained by means of the pseudo-second order and intra-particle models.

Key words: equilibrium, ion exchange, kinetics, nitrate, Purolite A-520E, sorption isotherm

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