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INSIGHTS INTO ISOTHERMS AND THERMODYNAMICS OF ADSORPTION OF NITRITES (NO_2-) FROM AQUEOUS SOLUTION ONTO A STRONG BASE ANION EXCHANGE RESIN: DOWEX-MARATHON MSA

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Abstract

Research studies were carried out to highlight the isotherms and thermodynamics of nitrite (NO_2^-) adsorption on Dowex-Marathon MSA resin. The adsorption data were fitted to Langmuir, Freundlich, Dubinin-Radushkevich, and Temkin-Pyzhev isotherm models. The highest correlation factor (R^2 = 0.9799) was observed in the case of Freundlich isotherm, which is characteristic for sorption upon a heterogeneous surface. The Gibb's free energy (ΔG^o = J/mol -0.361÷-2.929±0.009÷0.073 kJ/mol) for t = 20 – 60 ^oC, the standard enthalpy (ΔH^o = 17.15±0.428 kJ/mol), and the standard entropy (ΔS^o = 59.44 ±1.486 J/K mol) were determined as a function of surface coverage, indicating that the adsorption of nitrites on the studied resin was spontaneous and endothermic. This study provides further insight into nitrite adsorption on adsorbent materials.

Key words: adsorption isotherms and thermodynamics, Dowex-Marathon MSA, ion-exchange resin; nitrite removal

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