

Study on Equilibrium, Dynamics and Thermodynamic Parameters of Reactive Orange 16 dyes by Coconut-based Activated Carbon

홍동욱, 이종집^{1,†}

공주대학교; ¹공주대학교 화학공학부

(jjlee@kongju.ac.kr[†])

In this study, adsorption experiments of Reactive Orange 16 dyes by palm kernel activated carbon were carried out as function of the adsorbent amount, pH, initial concentration, contact time and temperature as adsorption variables. Adsorption equilibrium data were analyzed using Langmuir and Freundlich isotherms. The Langmuir equation showed better agreement with the two isotherms. The adsorption of Reactive Orange 16 by activated carbon from the evaluated Freundlich constant ($1/n=0.398\sim0.441$) and Langmuir separation factor ($R = 0.018\sim0.312$) was confirmed to be a suitable removal method. Adsorption kinetics experimental data were modeled using the pseudo-first-order and pseudo-second-order kinetic equation. The adsorption kinetics showed that the pseudo-second order reaction rate agrees well with the error rate. The adsorption process of Reactive Orange 16 on activated carbon was endothermic ($H=+157.433$ kJ/mol) and the Gibbs free energy value ($G=-3.16\sim-14.006$ kJ/mol) decreased with increasing temperature.