Adsorption Equilibrium, Kinetic and Thermodynamic Parameter Studies of Direct Blue 71 Using Coconut Shell Activated Carbon

안가현, 이종집[†]

공주대학교 공과대학

(jjlee@kongju.ac.kr[†])

In this study, the adsorption experiment of Direct Blue 71 dye using coconut shell activated carbon was carried out adsorption volume, pH, initial concentration, contact time, and temperature as adsorption variables. Adsorption equilibrium data were analyzed using Langmuir, Freundlich and Temkin adsorption isothermal formula. Adsorption equilibrium of Direct Blue 71 was best agreement Temkin isotherm model. Langmuir's separation factor(+0.1316~+0.1940) was found that adsorption of Direct Blue 71 by activated carbon was an appropriate removal method. The adsorption energy by Temkin model is 0.0419~0.0708 J/mol, indicating physical adsorption(B_T < 20 kJ/mol). Pseudo first order and pseudo second order model were used to determine the adsorption reaction kinetic. The kinetic interpretation adsorption of Direct Blue 71 followed pseudo first order kinetics model with high r2. Positive enthalpy change (+52.112 kJ/mol), indicating that this adsorption reaction is an endothermic reaction. The Gibbs free energy value decreased with increasing of temperature. Positive Gibbs free energy change(+3.780~+6.801 kJ/mol) indicated the involuntary process in the temperature range of 298~318 K.