

Study on the Equilibrium, Dynamic and Thermodynamic Properties of Acid Blue 40 Dye by Coconut Shell based Active Carbon

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Adsorption experiments of acid blue 40 dye by coconut shell activated carbon were performed adsorption volume, pH, initial concentration, contact time and temperature as adsorption variables. Adsorption equilibrium data were analyzed using Langmuir, Freundlich and Temkin adsorption isotherm models. Adsorption equilibrium of acid blue 40 was best agreement Langmuir isotherm model. Langmuir's separation factor (+0.2328~0.6753) was found that adsorption of acid blue 40 by activated carbon was an appropriate removal method. The Temkin's adsorption energy is 5.795~6.432 J/mol, indicating physical adsorption(<20 kJ/mol). The kinetic interpretation of adsorption, adsorption of acid blue 40 followed pseudo second order kinetics model with high  $r^2$ . positive enthalpy change (+17.242 kJ/mol) indicating that this adsorption reaction is an endothermic. The Gibbs free energy value decreased with increasing of temperature. Negative Gibbs free energy change(-0.0622~-1.2225 kJ/mol) indicated the spontaneous process in the temperature range of 298~318 K.