활성탄을 이용한 Direct Yellow 9 염료에 대한 평형, 동역학 및 열역학 파라미터의 연구

하지윤, 이종집[†]
공주대학교
(jjlee@kongju.ac.kr[†])

In this study, the adsorption experiment of Direct Yellow 9 dye using activated carbon were performed as adsorption variables of adsorption amount, initial concentration, contact time, temperature and pH. Adsorption equilibrium data were applied to Langmuir, Freundlich, Temkin, Dubinin-Radushkevich, Harkins-Jura and Halsey equations. The agreement was found to be the highest in the Langmuir model. The Langmuir separation coefficient (R_L= 0.55 to 0.86) and the Freundlich constant (1/n= 0.78 to 1.00) were evaluated to confirm that the adsorption of Direct Yellow 9 by activated carbon was an effective treatment method. Temkin constant (BT= 2.15~2.56 J/mol) and Dubinin-Radushkevich constant (E= 0.21~0.26 kJ/mol) showed that this process was physical adsorption. The kinetic analysis indicated that the adsorption process had high agreement with the pseudo second order model. The adsorption of Direct Yellow 9 by activated carbon was exothermic (ΔH=−5.71 kJ/mol) and spontaneous (ΔG=5.40~6.15 kJ/mol).