Removal of Basic Yellow 28 Dye from Aqueous Solutions Using Plastic Wastes

Authors : Nadjib Dahdouh, Samira Amokrane, Elhadj Mekatel, Djamel Nibou

Abstract : The removal of Basic Yellow 28 (BY28) from aqueous solutions by plastic wastes PMMA was investigated. The characteristics of plastic wastes PMMA were determined by SEM, FTIR and chemical composition analysis. The effects of solution pH, initial Basic Yellow 28 (BY28) concentration C, solid/liquid ratio R, and temperature T were studied in batch experiments. The Freundlich and the Langmuir models have been applied to the adsorption process, and it was found that the equilibrium followed well Langmuir adsorption isotherm. A comparison of kinetic models applied to the adsorption of BY28 on the PMMA was evaluated for the pseudo-first-order and the pseudo-second-order kinetic models. It was found that used models were correlated with the experimental data. Intraparticle diffusion model was also used in these experiments. The thermodynamic parameters namely the enthalpy $\Delta H°$, entropy $\Delta S°$ and free energy $\Delta G°$ of adsorption of BY28 on PMMA were determined. From the obtained results, the negative values of Gibbs free energy $\Delta G°$ indicated the spontaneity of the adsorption of BY28 by PMMA. The negative values of $\Delta H°$ revealed the exothermic nature of the process and the negative values of $\Delta S°$ suggest the stability of BY28 on the surface of SW PMMA.