

Adsorption Isotherm, Kinetic and Mechanism Studies of Some Substituted Phenols from Aqueous Solution by Jujuba Seeds Activated Carbon

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Abstract : Activated carbon was prepared from Jujube seeds by chemical activation with potassium hydroxide (KOH), followed by pyrolysis at 800°C. Batch studies were conducted for kinetic, thermodynamic and equilibrium studies on the adsorption of phenol (P) and 2-4 dichlorophenol (2-4 DCP) from aqueous solution, than the adsorption capacities followed the order of 2-4 dichlorophenol > phenol. The operating variables studied were initial phenols concentration, contact time, temperature and solution pH. Results show that the pH value of 7 is favorable for the adsorption of phenols. The sorption data have been analyzed using Langmuir and Freundlich isotherms. The isotherm data followed Langmuir Model. The adsorption processes conformed to the pseudo-second-order rate kinetics. Thermodynamic parameters such as enthalpy, entropy and Gibb's free energy changes were also calculated and it was found that the sorption of phenols by Jujuba seeds activated carbon was a spontaneous process. The maximum adsorption efficiency of phenol and 2-4 dichlorophenol was 142.85 mg.g⁻¹ and 250 mg.g⁻¹, respectively.

Keywords : activated carbon, adsorption, isotherms, Jujuba seeds, phenols, langmuir

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