Synthesis of Ionic Liquid Modified Resin for The Removal of Environmental Pollutant From Wastewater

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An ionic liquid modified (IL-XAD4) resin has been synthesized to study the adsorptive properties of an environmental pollutant; dibutyl phthalate (DBP). The analysis was carried out by HPLC with solvent composition of acetonitrile: water (75:25) at selected wavelength of 226 nm. The modified IL - XAD sorbent was characterized by FTIR. The experiment was carried out in batch mode. Influence of varying experimental conditions such as pH, contact time, temperature, shaking speed and concentrations were investigated on adsorption process. Adsorption was found to be most feasible at neutral pH. Adsorption equilibrium data were tested with Langmuir, Freundlich and D-R isotherm models. The Freundlich model provided best fit of the experimental data. Adsorption capacities calculated at different temperatures were found to be in increasing order with increasing temperature indicating the endothermic nature of adsorption process. Negative values of $\Delta G$ show the spontaneous nature of reaction. Whereas positive values of heats of adsorption ($\Delta H$) again confirm the endothermic nature of adsorption. $\Delta G_0$ calculated for DBP adsorption on IL-XAD at different temperatures are -5.72kJ/mol, -6.74 kJ/mol, -8.13kJ/mol and -8.68kJ/mol respectively suggesting the spontaneous nature of adsorption. The modified IL -XAD sorbent has successfully been applied on real samples for removal of dibutyl phthalate.