

Competitive Adsorption of Water and Trichloroethylene Vapors on a Hydrophobic Activated Carbon

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Activated carbon has been mainly used for the removal of pollutant vapors from air. Water vapor is frequently present at high levels in the atmosphere and may influence the adsorption properties of activated carbon. Thus, in this study, the competitive adsorption properties including adsorption equilibrium and column dynamics of TCE and water vapors on a hydrophobic AC were systematically investigated. Adsorption equilibrium data were correlated with a Dubinin-Astakov (DA) isotherm. In addition, both ideal adsorbed solution theory (IAST) and non-ideal adsorbed solution theory (RAST) were employed in a mass balance equations for a fixed-bed to describe the competitive adsorption. It was found that the proposed model successfully simulated the adsorption and desorption breakthrough curves.