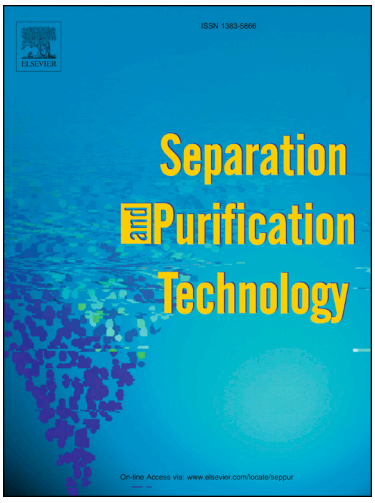

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Adsorption equilibrium and thermodynamics of acetaldehyde/acetone on activated carbon

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Abstract

The adsorption characteristics of acetaldehyde/acetone onto coconut shell activated carbon (CSAC) were investigated with a dynamic apparatus. The Langmuir, Freundlich and Sips models were used to analyze the adsorption isotherm data in single gas system, revealing that the Freundlich model most suitably described the adsorption of the two gases. Henry's law constant and the selectivity were investigated based on adsorption isotherms to understand adsorbent and adsorbate affinity. A thermodynamic study also revealed that the adsorptions were exothermic and phyiscal. The adsorption of these studied gases is likely to be heterogeneous. Acetone formed the more ordered configuration on CSAC, but molecular acetaldehyde has higher degree of freedom. For the binary adsorption system, the equilibrium data fit well with the Extended Freundlich model. The competitive adsorption experiment indicated that acetone was more selectively adsorbed than acetaldehyde on CSAC. In particular, because of the displacement of adsorbed