

Adsorption mechanism and equilibrium of water vapor on surface-modified activated carbons

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Adsorption has been considered as a promising candidate to replace the traditional separation technology because it is an energy saving process. In designing the adsorptive separation process, consideration of water vapor is essential because it may reduce adsorption capacity. However, most of the studies still utilize the feed conditions without water vapor. Therefore, water adsorption research on general gas separation adsorbent is required to remove water or understand the adsorption mechanism in humid feed conditions. In this study, water vapor adsorption equilibrium was measured and mechanism analysis was performed on activated carbon, which is one of the most utilized adsorbents. The surface of activated carbon was modified by acid, thermal and KOH treatment. The characterization of functional groups and physical structures were performed. The water vapor adsorption isotherms were measured on 283 K, 293 K,