Thermodynamic Properties of Carbon Dioxide on Activated Hollow Carbon Fibers from Ceiba pentandra (L.) Gaertn. (Kapok)

김정훈, 이재욱*
조선대학교
(jwlee@chosun.ac.kr*)

Hollow carbon fibers with a high adsorption capacity for the removal of methylene blue from aqueous solution were produced from Ceiba pentandra (L.) Gaertn. (Kapok). Steam was used for the oxidation and modification of the carbon surface. Compared to the kapok-derived carbonized hollow carbon fibers (KCHCF) without activation, the kapok-derived activated hollow carbon fibers (KAHCF) according to steam activation times showed a higher surface area (600~800 m2/g) and larger hollow pore volume [1]. Adsorption equilibrium of carbon dioxide on activated hollow carbon fibers derived from Kapok and Li-X Zeolite were measured. Adsorption isotherms were obtained at different temperatures (293.15, 303.15, and 313.15 K) and at pressures ranging from (0.1 to 20) atm using a static volumetric apparatus. The experimental data were predicted using the Langmuir model. Compared with the Kapok and the Li-X zeolite exhibited similar adsorption capacity for carbon dioxide. The isosteric enthalpies of adsorption and the limiting heat of adsorption for both adsorbates on Kapok and Li-X zeolite were calculated using the Clausius−Clapeyron equations, respectively.