

Relationship between Helium Degassing of Cattle-Manure-Compost Adsorbents and Copper Ions Removal

Abstract

This work was aimed to investigate the effect of helium degassing of cattle-manure-compost (CMC) based activated carbons on the adsorptive removal of copper ions from aqueous solution. Degassing temperatures were 500°C, 800°C and 1000°C. Activated carbons were characterized according to surface chemistry and pore structures. Adsorption of copper ions was carried out using the conventional bottle-point technique to which the equilibrium data were correlated to Langmuir and Freundlich models. Results indicated that the uptake of copper ions could be well characterized by Langmuir model. It was found that the adsorption of copper ions decreased with significant decrease in surface area as a result of helium degassing at higher temperature. The increase of electron density on graphene layers offered higher affinity towards copper ions at lower equilibrium concentration. It was inferred that copper ions favorably adsorbed on mesopores at lower equilibrium concentration and switched to micropores at higher equilibrium concentration.