

Ratchapol Batmart 2012: Adsorption of Water Vapor and Pollutants on Chars and Soil Minerals. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Apisit Songsasen, Ph.D. 222 pages.

The adsorption of water vapor and pollutants by soil minerals and chars from agricultural waste (AW), which studied in term of adsorption isotherm and thermodynamics of adsorption. The pore structure, surface character and functional group on surface of chars and soil minerals were characterized by SEM and FT-IR. The specific surface areas of adsorbents were calculated from the phenol and chromium (VI) adsorption. The results showed that the adsorption capacities of adsorbents depended on type of adsorbates and temperature. For adsorption of water vapor, montmorillonite had the highest adsorption capacity (0.4201 g/g). The phenol and chromium (VI) adsorption found that char from oil palm shell had the highest adsorption capacity. The specific surface areas of char from oil palm shell for phenol and chromium (VI) adsorption are 129.42 m²/g and 1.05 m²/g, respectively.

The adsorption isotherm of water vapor, phenol and chromium (VI) were studied. Adsorption isotherm of water vapor was fitted to Freundlich model as considered from the correlation coefficient (R^2) of plot between $\log q_e$ versus $\log C_e$. The adsorption isotherm of phenol and chromium (VI) were fitted to both Langmuir and Freundlich isotherm. Adsorption isotherm of phenol was also well fitted with Freundlich model when increasing temperature. In addition, the thermodynamic parameters of water vapor adsorption indicated that the positive values of ΔH° and negatives values of ΔG° were endothermic process and spontaneous by nature. Moreover, the thermodynamic parameters indicated that the phenol adsorptions on char from oil palm shell was exothermic process and spontaneous by nature. However, chars from bamboo and coconut shell are endothermic but spontaneous by nature.

Student's signature

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