

Adsorption behaviors of toluene on amine-impregnated activated carbon in a humid condition

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The emission of volatile organic compounds (VOCs) from many industrial facilities has become a global issue. Low concentration of indoor VOCs are the main pollutants in households. Toluene, one of the most common indoor VOCs, is carcinogenic and leads to health threats such as severe respiratory systems. Therefore, the removal of indoor toluene is essential.

Various toluene removal technologies are studied. Adsorption is the most suitable technology for indoor toluene removal. Yet, the modification of adsorbents is necessary to remain the adsorption capacity of indoor toluene in humid conditions.

In this study, the commercial activated carbon was impregnated with amine to improve adsorption performance in a humid condition. The impregnated amount was controlled, and physical properties were analyzed. The adsorption isotherms of toluene were at 288.15K, 298.15K and 308.15K. Then, the breakthrough experiments were performed at 298.15K, both in dry and humid condition (RH 50%). The performance between original activated carbon and modified activated carbon was compared. The results can contribute to designing a practical toluene removal application using modified activated carbons.