

Activated carbon fiber cloth adsorption-regeneration processes for indoor volatile organic compounds treatment

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ABSTRACT

Indoor air quality (IAQ) has been a matter of public concern in the United States and other countries in terms of its effects on human health. Volatile organic compounds (VOCs) are one of the predominant pollutants in indoor environment, whose concentrations are at the ppb levels. Adsorption using granular activated carbon (GAC) is a safe methodology for removing VOCs from indoor air. While GAC has been widely used to remove VOCs from indoor air, the use of activated carbon fiber cloth (ACFC) is a promising substitute to the conventional activated carbon, because of its higher adsorption capacities and regenerative properties. Hence, this paper provides promising results for the application of ACFC as an adsorbent for the removal of VOCs from indoor air, and assesses the impacts of operating variables on the adsorption performance of the ACFC. The adsorption-regeneration experiments were conducted with toluene at the concentration of 100 ppbv on a single layer ACFC. The ACFC exhibited remarkable adsorption properties. And the use of Joule heating regeneration technique showed that the ACFC was rapid and efficient in removing the low initial loading of toluene