

Fabrication of Activated Carbon Fibers from Oxidized PAN Fibers and their properties

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Activated carbon fibers were prepared from stabilized PAN fibers by physical and chemical activation to compare their characteristics. The variations in specific surface area, pore size distribution and amount of iodine adsorption in the activated carbon fibers after the activation process are discussed. In physical activation using steam, carbonization and activation were simultaneously carried out. A specific surface area of $1635 \text{ m}^2/\text{g}$ was obtained after heat treatment at 990°C . In chemical activation using KOH, a specific surface area of $2545 \text{ m}^2/\text{g}$ was obtained with the conditions of 800°C and a KOH/stabilized PAN fiber ratio of 1:1. Nitrogen adsorption isotherms for fabricated activated carbon fibers showed type I and mixtures of type I and II in the Brunauer-Emmett-Teller (BET) classification. Increasing specific surface area increased the amount of iodine adsorption in both activation methods. This was because the ionic radius of iodine was smaller than the interior micropore size of activated carbon fibers.

Comparison of Activation Processes of Carbon Fibers and Related Properties

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Activated PAN-based carbon fibers were prepared from two different processes: single and double step preparation. Double step process is composed of carbonization and activation, single step process is a direct activation. Single step process results in higher yield of the fibers than double step process. Different activation process does not quite affect the BET surface area of the samples, single step activation process could reduce time and cost of the activated carbon fiber preparation.