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Molecular probe characterization of microporous carbons

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Microporous and mesoporous carbons are excellent materials for any energy applications. As capacitors, they exhibit high power, a large life cycle, high reliability, and low cost. Coconut shell carbons dominate this market because of their low cost. The large surface areas of these carbons also make them useful in many adsorption and catalytic systems. The pore structure of these carbons allows special selective processes to be carried out such as separation of O₂/N₂, CO₂/H₂O, Butene/Isobutene and many other processes. The detailed parameters of each process play an important role in the selectivity and effectiveness of the process.

In the work presented, some of the most important parameters are discussed for microporous and saran fibers at temperatures from 200°C to 1000°C. These materials exhibited adsorption characteristics of 4A angstrom and 5A angstrom molecular sieves. Activated diffusion is shown to be the dominant factor for exclusion of specific molecules. The dynamic size and shape of the molecules determines the observed amount of adsorption at a specific time and temperature. It can be concluded that when the molecular dimensions are close to the size and shape of the pores, the most important factors that determine the observed adsorption are time, temperature, relative pressure, and the diffusion path length.

Biography

Larry G Christner received his Ph.D. from Pennsylvania State University in 1972 followed by 5 years at United Technologies Corporation working on carbon deposition in steam reforming and materials development for fuel cells. He spent the next 23 years at Fuel Cell Energy starting as Manager of materials science and was later promoted as Vice President. He retired in 2001 and started LGC Consultants LLC.

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