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Rigid and Microporous Polymers for Gas Separation Membranes

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Abstract

Microporous polymers are a class of microporous materials with high free volume elements and large surface areas. Microporous polymers have received much attention for various applications in gas separation, gas storage, and for clean energy resources due to their easy processability for mass production, as well as microporosity for high performance. This review describes recent research trends of microporous polymers in various energy related applications, especially for gas separations and gas storages. The new classes of microporous polymers, so-called thermally rearranged (TR) polymers and polymers of intrinsic microporosity (PIMs), have been developed by enhancing polymer rigidity to improve microporosity with sufficient free volume sizes. Their rigidity improves separation performance and efficiency with extraordinary gas permeability. Moreover, their solubility in organic solvents allows them to have potential use in large-scale industrial applications.

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