

Thermal annealing effect on gas permeability of high permeable membrane

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Heterocyclic glassy polymers such as polyimide, polybenzimidazole, and polybenzoxazole were considered desirable candidates for small molecule separation membrane materials because they have excellent mechanical, thermal and chemical stability with good gas separation performance. However, gas permeability was extremely lower than rubbery polymer due to their rigid backbone and amorphous rigid structure. So, we have discovered glassy amorphous polymers showing unusual microporous features, from the thermally forced rearrangement of confined polymer chains in the solid state, that lead to outstanding permeability and selectivity for small gas molecules. Here, we characterized the optimized thermal treatment conditions to find suitable gas permeation performance at various thermal treatment temperatures.