The gas permeation properties of polybenzoxazoles derived from hydroxyl-group containing polyimides with various swivel groups

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In the field of membrane-based gas separation, it is no doubt that an ultimate goal is to develop ideal materials having high permeability and selectivity for gas mixtures. Here, we introduce nano-porous organic polymer materials containing large and accessible surface area above 500 m^2g^{-1} and micropores with dimensions in the range < 2 nm. Compared to conventional micro-porous polymers having high free volume or organic network polymers, the present nano-porous polymers show an excellent molecular sieving effect even for gas pairs with small molecules, as well as ultrapermeable characteristics in gas separation. The nano-porous polymers were easily obtained from hydroxyl-group containing polyimide during simple thermal conversion process at 450 °C. Also we researched structure-gas permeation properties of PBO having various swivel groups. All of the polymer samples are converted from hydroxy-containing polyimide to polybenzoxazole. We characterized O_2 permeability and O_2/N_2 selectivity for our polymer samples and we confirmed that the O_2 permeability and O_2/N_2 permselectivity was dramatically varied with their polymer backbone structure.