Bromination/debromination-induced Thermal Crosslinking of 6FDA-Durene for Aggresive Gas Separations

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A new method for enhancing condensable gas-induced plasticization resistance of aromatic polyimides (PIs) as well as increasing the flux of gas penetrants with negligible selectivity loss was demonstrated via a so-called bromination/debromination-induced thermal crosslinking. Our newly developed crosslinking approach essentially loosened the polymeric chain packing of 6FDA-Durene PIs by forming ethylene crosslinking bonds, while retaining its rigid PI backbone. As the degree of crosslinking increased, the permeability increased with trivial selectivity loss. As a result, outstanding separation performances for CO2/N2, CO2/CH4 and C3H6/C3H8 gas pairs have been obtained, and most importantly, a high tolerance to CO2 or C3H6 induced plasticization was observed.