

Study of the structure–property relationship of glassy polymer membranes with microcavities

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Glassy polymers have been believed to have very low gas permeabilities resulted from their high packing densities and low fractional free volumes(FFV). PTMSP, one of the representative highly porous glass polymer, has attracted attention to the extraordinary permeation properties with increased free volume in polymer matrix. Recently we reported a novel method to tune microcavities in glassy polymers as a result of decarboxylation of polyimide with ortho–functional groups during thermal treatment. Polybenzoxazole membranes from hydroxyl–polyimide have higher free volume in comparison with typical glassy polymers and show extraordinary performances for gas and vapor permeations. In this research, the structure–property relationship is studied with various dianhydrides and diamines with functional groups.