Structural Orientation of amphiphilic crystalline polymer membranes

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In this work, conversion in the structural orientation from an amphiphilic crystalline polymer to a highly ordered microphase-separated lamellar structure on a hydrophobic surface has been investigated. By surface graft polymerization of poly(ethylene glycol)behenyl ether methacrylate onto poly(trimethylsilyl) propyne in the presence of allylamine, resulting material could effectively improve the CO_2 capture property of the membranes. The role of allylamine is crucial for controlling the crystalline phase, configuration, and permeation properties. High CO_2 permeability of 501 Barrer and a CO_2 /N_2 ideal selectivity of 77.2 are obtained with optimized reaction conditions, which exceed the Robeson upper bound limit. Such result is noteworthy for a membrane fabricated via a simple surface modification method.