

## All Polymeric, Dual Phase Membranes with Graft Copolymer Filler for CO<sub>2</sub>/N<sub>2</sub> Separation

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Dual-phase, high-performance, all-polymeric membranes that exhibit improved CO<sub>2</sub> permeability and CO<sub>2</sub>/N<sub>2</sub> selectivity are manufactured. The graft copolymer poly (2-[3-(2H-benzotriazol-2-yl)-4-hydroxyphenyl]ethyl methacrylate)-graft-poly(oxyethylene methacrylate) (PBE) is incorporated in a poly(amide-b-ether) block copolymer (Pebax) matrix. The amphiphilic PBE filler selectively interacts with Pebax. The formation of interconnected CO<sub>2</sub>-philic network channels within the matrix is achieved by selective interaction of the amphiphilic PBE filler with Pebax. The membranes show a dual-phase, microphase-separated morphology, and good thermal/mechanical properties, which are confirmed by characterizations. The best performance, a CO<sub>2</sub> permeability of 175.3 Barrer and a CO<sub>2</sub>/N<sub>2</sub> selectivity of 48.2, is much higher than those of neat Pebax. Therefore, these all-polymeric, dual phase membranes are adequate for the commercialization of gas separation due to their simple, low cost fabrication method.