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Block copolymer ion gels for gas separation YUANYAN GU, Department of Chemistry, University of Minnesota, TIMOTHY LODGE, Department of Chemistry and Department of Chemical Engineering and Materials Science, University of Minnesota — Carbon dioxide removal from light gases (eg. N_2, CH_4, and H_2) is a very important technology for industrial applications such as natural gas sweetening, CO_2 capture from coal-fire power plant exhausts and hydrogen production. Current CO_2 separation method uses amine-absorption, which is energy-intensive and requires frequent maintenance. Membrane separation is a cost-effective solution to this problem, especially in small-scale applications. Ionic liquids have recently received increasing interest in this area because of their selective solubility for CO_2 and non-volatility. However, ionic liquid itself lacks the persistent structure and mechanical integrity to withstand the high pressure for gas separation. Here, we report the development and gas separation performances of physically crosslinked ion gels based on self-assembly of ABA-triblock copolymers in ionic liquids. Three different types of polymers was used to achieve gelation in ionic liquids. Specifically, a triblock copolymer ion gel with a polymerized ionic liquid mid-block shows performances higher than the upper bound of well-known "Robeson Plot" for CO_2/N_2.

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