

Abstract Submitted  
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**Controlling Solution Self-assembly and Non-Solvent Induced Microphase Separation of Triblock Terpolymers to Generate Nanofiltration Membranes with Chemically-Tailored Pore Walls** BRYAN BOUDOURIS, RYAN MULVENNA, Purdue University, JACOB WEIDMAN, WILLIAM PHILLIP, University of Notre Dame — Block polymer-based templates have been utilized in a number of membrane applications; however, there has yet to be a demonstration of a nanoporous block polymer thin film that can achieve high flux and high selectivity simultaneously while also allowing for the facile tuning of the pore wall chemistry. Here, we demonstrate that by synthesizing and controlling the solution self-assembly of a triblock terpolymer, polyisoprene-*b*-polystyrene-*b*-poly(*N,N*-dimethylacrylamide) (PI-PS-PDMA), and precisely inducing non-solvent induced phase separation during the self-assembly process allows for the creation of an asymmetric nanoporous membrane with PDMA-lined pore walls. This PDMA functionality is then converted to any number of side chain functionalities through simple chemistry in the solid state. In this way, we are able to show a highly selectivity membrane that can separate analytes of interest based both on size and chemical composition at a high solution flux. In fact, this high fidelity structure has a very narrow distribution of pore sizes (<10% variation in diameter) over large areas (>500 cm<sup>2</sup>). This has allowed for the separation of particles with hydrodynamic radii as low as 0.8 nm, which is the smallest separation achieved using a block polymer-based membrane to date.

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