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Fabrication of ultrafiltration membranes using dynamic thermal annealing of Block Copolymer films ALAMGIR KARIM, YAN LUO, YAN SUN, The University of Akron — Block copolymer (BCP) thin films have attracted immense attention for fabrication of ultrafiltration membranes due to their potential to provide dense nanostructured pores giving high flux and good efficiency. We have demonstrated generation of well-ordered hexagonally packed perpendicular cylindrical BCP films with greater than 90 percent of perpendicular cylinders over large areas with high cylinder density and desired porosity at the nanoscale via facile dynamic thermal annealing. The films are then transferred to a support membrane and subsequently the vertically oriented minority block is selectively etched to form a nanoporous membrane. The porosity of film and pore density is tuned by addition of selective homopolymer block component. The structure of nanoporous BCP membranes is characterized by Atomic Force Microscopy(AFM), Grazing Incidence Small Angle X-ray Scattering and Transmission Electron Microscopy(TEM). We further demonstrate the application of these membranes for separation of emulsions and correlate flux and efficiency to parameters such as porosity, membrane thickness and tortuosity.

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