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Effects of repeated wet/dry cycling on the structure and performance of sulfonated pentablock copolymer membranes. PHUC TRUONG, GILA STEIN, university of houston — Sulfonated block copolymers have shown potential as membranes for water purification. However, the performance of these materials under cyclic wet/dry conditions is not well understood. We measured the membrane structure, mechanical properties, and water vapor transport rates in a sulfonated pentablock copolymer as a function of the number of wet/dry cycles. The polymer is synthesized with an ABCBA block sequence, where A is poly(t-butyl styrene), B is poly(hydrogenated isoprene), and C is poly(styrene sulfonate). The ion exchange capacity is 2 meq, and membranes were prepared by coating from a solution. Using small angle X-ray scattering, we find the structure in as-prepared membranes resembles disordered micelles, and the characteristic length scale swells slightly with each wet/dry cycle. This lattice swelling is likely constrained by the glassy end-blocks. We also detect a lower yield point and less overall tensile strength with repeated cycling. Water vapor transport rates vary with the number of wet/dry cycle, however no specific trend was observed.

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