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Electrospinning of an Alkaline Polymer Electrolyte SUPACHAREE RODDECHA, ZEXUAN DONG, YIQUAN WU, MITCHELL ANTHAMATTEN, University of Rochester — The polymer electrolyte membrane is a key component of the low temperature fuel cell to block fuel and electron crossover, while enabling ions to pass and complete the half-cell reactions. Proton exchange membranes (PEMs) are anion-containing polymers, such as Nafion, which offer proton conduction pathways. Alkaline polymer electrolytes utilize hydroxyl anions as charge carriers and are currently being researched as an alternative to PEMs because they may offer the use of inexpensive metal catalysts. However, hydroxyl anion in an alkaline electrolyte has relatively low mobility compared to that of protons in an acid electrolyte; hence a high concentration of OH^- is required to obtain high ionic conductivity. Here, we report the use of an electrospinning process to prepare nonwoven membranes. Polysulfones are first functionalized with varied ionic content of quaternary ammonium functional groups and then are electrospun to get alkaline electrolyte mat. The morphology at various ionic content, mechanical property, and in-plane conductivity of resulting films will be discussed and compared to solvent-cast films of the same material.

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