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Structure and Properties of a Semi-crystalline Cationic Polymer for Anion Exchange Membranes FREDERICK BEYER, SAMUEL PRICE, ALICE SAVAGE, XIAOMING REN, US Army Research Laboratory, INSANE MEMBRANES COLLABORATION — Nafion has long been studied in order to understand its combination of good mechanical properties, chemical resistance, and excellent charge transport characteristics. In the past decade, uncertainty regarding the morphological behavior of Nafion has largely been resolved, allowing researchers to mimic and improve on the structure of this material. In this presentation, work to incorporate key characteristics of Nafion into a model cation-containing polymer will be described. In these new materials, semi-crystalline atactic poly(norbornene) is used to introduce good mechanical properties to anion-exchange membranes, analogous to the PTFE crystallites in Nafion. The ether linkages between the charged species and backbone are also utilized to place the cationic species (trimethylamine) in our materials into a mechanically soft environment. The resulting polymer shows some characteristics that are similar to those of Nafion. In this presentation, the synthesis, alkaline stability, mechanical properties, morphological behavior and charge transport properties will all be described.

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