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The Effect of Salt on the Biaxial Viscosity and Creep Behavior of Polyelectrolyte Complex Films SHAWN CHEN, KAZI SADMAN, KENNETH SHULL, Northwestern University — Abstract Oppositely charged polyelectrolytes can lead to a phase separation phenomenon that results in materials with a diverse set of properties ranging from solutions to gels to solid precipitates. In this work stoichiometric polyelectrolyte complex (PEC) films of poly(styrenesulfonate) (PSS) and poly(diallyldimethylammonium) (PDADMA) were investigated using a custom-built biaxial membrane inflation test. Circular PEC films in contact with a variety of aqueous salt solutions were deformed by applying a preferential differential across the membrane. In each case, the material response consists of (1) an instantaneous elastic deformation, (2) a transient creep regime, and (3) a steady-state flow regime. We use the measured elastic moduli, creep compliances and biaxial viscosity values to provide insights to the density and lifetime of intermolecular ionic complexes within the materials.

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