

Abstract Submitted
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Effects of drying and ionic strength on non-linear growth of polyelectrolyte multilayers¹ VICTOR SELIN, Department of Materials Science Engineering, Texas AM University, College Station, Texas 77843, USA, JOHN ANKNER, Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831, USA, SVETLANA SUKHISHVILI, Department of Materials Science Engineering, Texas AM University, College Station, Texas 77843, USA — We report on factors affecting the non-linear growth of electrostatically assembled polyelectrolyte multilayer (*nl*PEM) films. The films were assembled by the layer-by-layer (LbL) technique using poly(methacrylic acid) as the polyanion and quaternized poly-2-(dimethylamino)ethyl methacrylate as the polycation. Evolution of the film thickness was systematically monitored during LbL multilayer formation, including both dry and *in situ* measurements. Spectroscopic ellipsometry measurements of dry and wet film thicknesses indicated that *nl*PEM films were highly swollen (2-4 fold). Moreover, the swelling ratio could be controlled by the application of a drying step after each deposition cycle, and enhanced by the presence of salt during *nl*PEM assembly. Probing the film internal structure using neutron reflectometry showed that the *nl*PEMs were interdiffused yet stratified. The degree of intermixing between neighboring layers can be controlled during film deposition. While the application of drying between layer deposition steps improved film stratification, the presence of 0.1-0.3 M NaCl resulted in more interdiffused films, with the interfacial widths exceeding the radius of gyration of the polymer chains.

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