Layer Thickness and Charge Compensation of Polyelectrolyte Multilayers

QIANG WANG, Department of Chemical and Biological Engineering, Colorado State University — Using a continuum self-consistent field theory, we have modeled the sequential process of layer-by-layer assembly of flexible polyelectrolytes on flat surfaces as a series of kinetically trapped states. Up to 60 depositions of oppositely charged polyelectrolytes (A and B) are performed, each followed by a washing step. Here we focus on the effects of polymer charge fractions, bulk salt concentrations, solvent qualities for A and B, and their incompatibility on the layer thickness and charge compensation of the polyelectrolyte multilayer. We also compare our modeling with available experimental measurements.

Acknowledgment is made to the donors of Petroleum Research Fund, administered by the ACS, for support of this research.