Hydrogen-Bonded Polyelectrolyte Multilayers: From Fundamentals to Applications

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I will first discuss the fundamentals of self-assembly of hydrogen-bonded temperature- and pH-responsive layer-by-layer (LbL) films and capsules. These will include the relationships between the type and strength of polymer/polymer interactions, as well as between self-assembly conditions (such as pH and temperature) and film response. Quantification of the amount of polymers adsorbed and the degree of ionization of carboxylic groups has been performed using *in situ* Fourier transform infrared spectroscopy in attenuated total reflection (FTIR-ATR), while the degree of layering within such films is probed by neutron reflectometry.

I will then give several examples of designing LbL films and capsules with engineered response to environmental stimuli, such as pH, ionic strength or temperature, and the use of such films and capsules as platforms for controlled loading and release of chemical and biological molecules.