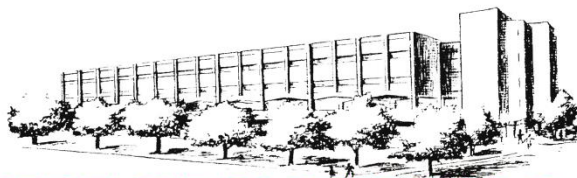


UNIVERSITY OF CONNECTICUT



INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

**“Self-Energy Effects of Salt Ions on Phase Behavior
and Interfacial Properties”**

**Prof. Zhen-Gang Wang
California Institute of Technology**

**Friday, August 21, 2015
11:00 AM, IMS Room 20**

Ions are essential in physical chemistry, colloidal science, electrochemistry, biology and many other areas of science and engineering. While their role is commonly described in terms of screening and translational entropy, many phenomena, ranging from some classical experimental observations made many decades ago to some new systems of current interest, cannot be explained, even qualitatively, by these concepts. A key effect that is often ignored or inadequately treated in the main literature on electrolytes and polyelectrolytes is the self-energy of the ions. In this talk, I will discuss several self-energy effects in macromolecular and interfacial systems. First, we show that the preferential solvation energy of the ions provides a significant driving force for phase separation. This concept is used to develop a theory to explain the dramatic shift in the order-disorder transition temperature in PEO-PS diblock copolymers upon the addition of salt. Second, we show that the dielectric contrast between the polymer backbone and the solvent significantly affects the conformation and charge condensation in dilute polyelectrolyte solutions. Third, we show that the image force has qualitative effects on the double layer structure and forces, such as like charge attraction and charge inversion. Finally we present a simple model for understanding the specific ion effects in the interfacial activity for air/water and oil/water interfaces.

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