

Introduction for *J. Physical Chemistry B* special edition: papers from the International Symposia on Polyelectrolytes meeting in Lund, Sweden, June 15 - June 19, 2002

Polyelectrolytes 2002 in Lund, Sweden, was the fourth in a series of International Symposia on Polyelectrolytes that began in 1995. The mission of the ISP organization is to bring together scientists working in the field of polyelectrolytes, a subject of fundamental interest, and one that is highly relevant to problems in biology, in the development of new materials, and in numerous industrial applications. Polyelectrolytes has been an active area for experiment, theory and simulations for many years, and the topic of polyelectrolyte multilayers is only one recent example of how both theory and applications can drive the rapid growth of work on polyelectrolyte phenomena. Despite this breadth of interest, the field has been rather fragmented, particularly in America, where research is dispersed among departments of Chemical Engineering, Polymer Science, Materials Science, Physics and Biochemistry, as well as more traditionally, in Chemistry departments. The ISP provides venues in which this research community can interact and exchange ideas.

Subsequent to a foundational meeting at the 205th ACS meeting in 1993, four international meetings have been organized under the aegis of the ISP: Potsdam, Germany (1995); Inuyama, Japan (1998); Les Diablerets, Switzerland (2000); and Lund, Sweden (2002). The various proceedings have been documented in an ACS Symposium Series, and in special editions of *Physical Chemistry - Chemical Physics (Berichte der Bunsengesellschaft)*, and *Langmuir*. While each meeting has addressed the broad field of Polyelectrolytes, each has had special focus areas as well, such as polyelectrolytes at interfaces, ionic gels, colloidal systems, biopolyelectrolytes, or polyelectrolyte complexes. An international coordinating committee, whose membership currently comprises H. Dautzenberg (Teltow), P. Dubin (Indianapolis), R. Farinato (Stamford), E. Kokufuta (Tsukuba), A. Khoklov (Moscow), and M. Rinaudo (Grenoble), is charged with the responsibility of maintaining the continuity of these meetings by ensuring appropriate venues and corresponding local organizers. Polyelectrolytes 2004 will take place in Amherst, Massachusetts.

The 47 talks and 103 posters presented by the 171 participants attending Polyelectrolytes 2002 in Lund, Sweden, addressed significant developments across the field of fundamental and applied polyelectrolyte science. The diversity of topics was reflected in the titles of the symposium sessions: Conformation and ion effects, Polyelectrolyte complexes, Amphiphilic polyelectrolytes and self-assembly, Polyelectrolytes at surfaces and interfaces, Interactions and structure formation, Polyelectrolytes and proteins, and Polyelectrolytes and surfactants. The symposium was particularly rich in the blending of studies of biological and synthetic polyelectrolytes, and also in the way that experimental work, theoretical work, and simulations were brought together in each session. Special attention was paid to interactions and structure formation in mixtures of oppositely charged polymer-colloid pairs – a theme recurrent in all sessions. Oppositely charged pairs are found in numerous applications, such as separation methods in

biotechnology, DNA transfection, paper retention, drug delivery, and the control of food texture. From a scientific point of view, oppositely charged mixtures, and in particular such mixtures where hydrophobic interactions also play a key role, represent a particularly active area at present, experimentally as well as theoretically.