Preface to the 13th Physics and Chemistry of Ice Conference (PCI-2014)

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Special Issue Preface

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Preface to the 13th Physics and Chemistry of Ice Conference (PCI-2014)

This special section of the *Journal of Physical Chemistry B* is the result of the 13th International Conference on the Physics and Chemistry of Ice (PCI-2014) held at Thayer School of Engineering, Dartmouth College, Hanover, New Hampshire, USA, on March 17−20, 2014.

PCI conferences are held every four years, with a different location and local organizing committee each time. Continuity between meetings is provided by a scientific committee, an international slate of prominent scientists in the field who also reviews abstracts, selects speakers, and awards prizes. The four-day PCI-2014 was well attended, with 94 delegates representing 16 countries. This special section presents a sampling of the 60 talks and 39 posters presented at the conference and in that sense represents the current research trajectories in the field of ice physics and chemistry.

As organizers, one of the things we were reminded of while organizing conference sessions is the incredible breadth of the field. Ice is studied by chemists, biologists, glaciologists, physicists and astronomers, geologists, atmospheric chemists, materials scientists, and engineers, just to name a few. We are interested in it for its contents, its structure, and as an analogue for other materials (e.g., quartz).

At PCI-2014, the subject discussed in the greatest number of talks was gas hydrates (14), a pattern we see repeated in this special section. Other areas with a strong presence at PCI-2014 included ice surfaces (9), chemistry (5), and interfaces and growth (5 talks each). Sessions on ice phases, defects, snow, macroscopic properties, and mechanics each included four talks. This represents a shift from previous years' focus on defects in ice and electrical and mechanical properties. This probably represents both progress in these areas in the intervening years as well as the current interests of the scientific community, particularly those of attendees.

The conference opened with John Wettlaufer's "whirlwind tour" of the field of ice interfaces during phase transitions ("The Many Facets of Ice Interfaces"), which he began by noting the advantages of studying ice, "an excellent model system because it exhibits all of the phase transition phenomena that we study in materials, but with some distinct advantages". These include its availability, accessibility, nontoxicity, transparency, and environmental relevance. Nonetheless, ice is, as Mikhail Kirov says in his paper, "The Hidden Asymmetry of Ice", both "a very complex and fundamentally important solid". Wettlaufer concluded his talk by mentioning some of the problems and challenges of studying ice interfaces, from the difficulties of examining delicate and unstable surfaces to the complexities of emergent phenomena.

One of the advantages of a conference such as PCI-2014 is the opportunity to communicate formally and informally with scientists who have addressed these problems from a variety of perspectives, and who have used, between them, a wide variety of materials characterization techniques. We hope this special section gives you a taste of some of these approaches, and gratefully acknowledge the effort of all of the contributing authors toward its publication.

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