

## **Polymer incorporated crystalline complexes for ionics and electronics**

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Crystalline complexes containing polymeric components are found in some of the most amazing materials that exist in nature. For example, spider silk has extruded protein based nanocrystals in an elastic matrix. Calcium carbonate crystals guided in nanoconfinement with natural polymer template contribute to the fine appearance of a pearl and toughness of a shell. Efforts are underway to transfer some of that knowledge to the field of organic electronics and solid state ionics. Herein we present three case studies in light of experimental techniques including low dose transmission electron microscopy and electrical measurements. In the first case, polymer electrolytes with mitigated crystal growth and increased charge hopping provide enhanced ion transport. In the second example, additive guided organic semiconductor growth leads to optimized grain structures and crystal formation for thin film transistors. Finally, progress has been made in polymer-salt complexes in order to achieve enhanced performance for energy storage applications.

### **Biography**

Dr. Jihua Chen is a research staff at the Center for Nanophase Materials Sciences, Oak Ridge National Laboratory. He obtained a PhD in Macromolecular Science and Engineering from the University of Michigan at Ann Arbor in 2006, followed by a postdoctoral position at the University of Minnesota, Twin Cities before joining ORNL. He served as a reviewer for various scientific journals and research programs. He is an author or coauthor of 150 peer reviewed publications in areas of ion and electron conducting polymers, block copolymers, polymer brushes, biomimetic materials, organic semiconductors, as well as nanostructured hybrid materials for energy and medicine applications.