

## **NANOSTRUCTURED HYBRIDS FOR ENERGY APPLICATIONS**

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### **Abstract**

In recent years, “storm clouds” have been forming at the interface of energy resources, environment, and climate change that demand concerted action by scientists, engineers, and policy makers. In this talk I will present a new materials platform based on organic-inorganic nanocomposites that provides unusual technological opportunities for addressing some of these challenges. Because of their hybrid nature, the properties of the nanocomposites can be tailored over an unusually wide range. On one end of the spectrum are materials, which display properties similar to crystalline solids, stiff waxes, and gels. At the opposite extreme are particle-based ionic fluids characterized by transport properties remarkably similar to simple liquids but with negligible vapor pressures. These features are advantageous for a broad range of applications, including sorbents for CO<sub>2</sub> capture, membranes for water purification, heat transfer fluids for solar to thermal conversion systems, fluorescent tracers for oil exploration and components for fuel cells and batteries.