Metal-Organic Frameworks (MOFs) are crystalline materials in which metal ions or metal-ion clusters are linked by rigid organic molecules, creating a supramolecular network that has permanent nanoporosity. Unwanted “guest” species, which can be solvent molecules or residual reactant, can be removed without pore collapse. Once a MOF is activated, it provides a highly ordered, chemically tailorable structure that can function as a nanoscale catalytic reactor, store gases such as hydrogen, or serve as an active component of electronic devices. This presentation will first provide an introduction to MOFs as a novel class of materials, followed by three vignettes highlighting results from the Sandia MOF group in which the “Guest@MOF” concept is used to create materials with emergent properties. The results demonstrate that the novel features of MOF structures provide an opening to achieve completely new classes of materials with properties unlike those of the guest or MOF in isolation.

Bio

Dr. Mark D. Allendorf is a Senior Scientist at Sandia National Laboratories in Livermore, California and holds degrees in chemistry from Washington University in St. Louis (A.B.) and Stanford (Ph.D.). At Sandia, he leads efforts to develop the fundamental science and applications of metal-organic frameworks (MOFs) and related materials. Current research interests include MOFs for electronic devices, catalysts for biofuels production, and gas storage. In addition to his work on MOFs, Dr. Allendorf is Director of the Hydrogen Materials Advanced Research Consortium (HyMARC), a team of three DOE National Laboratories focused on foundational research to enable development of new hydrogen storage materials. He is President Emeritus and Fellow of The Electrochemical Society and has received awards for research, leadership, and teamwork, including a 2014 R&D100 Award for a novel approach to radiation detection.

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2:00 - 3:00 p.m.
Refreshments will be served at 1:45 p.m.