

UC SAN DIEGO NANOENGINEERING SEMINAR

Tuesday, January 30th, 2018 11:00am – 12:00pm

Faculty Recruitment Seminar Presentation

ASML Conference Center (SME 248)

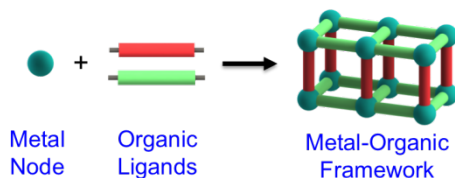
“Developing Chemically Stable Metal-Organic Frameworks as Materials for Clean Energy and Negative Thermal Expansion Technologies”

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Abstract: Metal-organic frameworks (MOFs) are crystalline, nanoporous materials with exceptionally high internal surface areas and chemically tunable structures that make them attractive candidates for a wide range of clean energy technologies. This seminar will first introduce the critical topic of understanding chemical stability properties in MOFs. Instability in the presence of water is a key application hurdle for a large number of promising MOF materials, and this research lays critical groundwork for overcoming this longstanding challenge. The remainder of this seminar will introduce ongoing work towards developing MOFs as precisely tailored negative thermal expansion materials. Positive thermal expansion can cause significant stress or even catastrophic device failure in applications where materials are placed in confined environments. Tailored negative thermal expansion materials would mitigate such problems and be of significant value for a wide array of material engineering and design challenges.



Building units and final structure in MOFs. The diversity of metals and ligands available as building blocks make the number of possible MOFs near infinite.

Biosketch: Nicholas Burtch is a Harry S. Truman Fellow in the Energy Nanomaterials Department at Sandia National Laboratories in Livermore, CA. He was born in Canada but also spent time living in the United States and Dubai before receiving his B.S.E from the University of Michigan and Ph.D. from the Georgia Institute of Technology, both in chemical engineering. His general research interests include the synthesis, engineering and design of multifunctional nanomaterials for adsorption and materials science applications. Nick currently leads a research project at Sandia National Laboratories towards engineering novel negative thermal expansion material solutions for additive manufacturing technologies.