Chemical Engineering Distinguished Young Scientists Seminar

Developing chemically stable metal-organic frameworks for environmental applications via modeling and experiment

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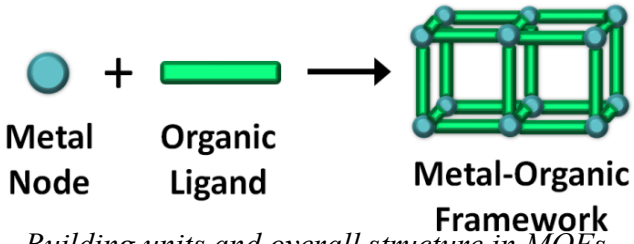
Date: Monday, June 29, 2015
Time: Lecture: 4:00-5:00 p.m.
Place: PAA A110
Happy Hour in Benson Hall Lobby

Abstract

Metal-organic frameworks (MOFs) are crystalline, nanoporous materials formed by the self-assembly of organic ligands and inorganic metal ions. Their exceptionally high internal surface areas and chemically tunable structures make them ideal candidates for environmental applications such as air purification, chemical sensing, hydrogen and methane storage, catalysis, and CO_2 capture. Chemical instability in the presence of water is one of the last key challenges for the widespread use of these materials. This seminar will discuss the complimentary experimental and molecular modeling techniques that can be used to understand the important structure-property relationships governing the selective gas adsorption and chemical stability properties in MOFs. Experimental and computational results obtained on various isostructural MOFs will be presented to illustrate these points. This research lays critical groundwork for addressing the longstanding chemical stability challenge in MOFs, thus allowing the use of these materials in commercial applications that would revolutionize the field of adsorption.



Building units and overall structure in MOFs.

BIO

Nick was born in Canada but also spent time living in the U.S. and Dubai before receiving his B.S.E. in chemical engineering from the University of Michigan. He completed two internships at Procter & Gamble and spent one summer at an herbal medicine research center in Ghana before becoming a PhD student in Prof. Krista Walton's group at Georgia Tech. His research interests include the experimental synthesis and computational design of nanoporous materials for adsorption applications.