



SCHOOL OF NATURAL SCIENCES CHEMISTRY SEMINAR 291

Materials Synthesized Using Symmetric Building Blocks: From Chiral Helix to Sustainable Polycyclobutane

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ABSTRACT

The construction of organic materials with well-controlled structures is a synthetic challenge. Our research group is exploring one aspect of this challenge by using symmetric building blocks. In the first part of the presentation, I will show the chiral helixes and sheets that spontaneously assembled under mild conditions from symmetric supramolecular atropisomers, such as N,N',N''-tris(n-octyl)benzene-1,3,5-tricarboxamide. By introducing cyclohexyl side chains as 'pillars' between the sheets, the lamellar material gained the capacity to accommodate and release guest molecules with conformational transformation of the cyclohexyl groups. This amphiphilic material formed nonpolar cavities and displayed dynamic host-guest responses, both of which are important for green applications such as H₂ and CH₄ storage. In the second part of my talk, I will discuss the synthesis of polycyclobutanes (PCBs), like covalently bonded twodimensional (2D) polymers from symmetric monomers. These novel polymeric materials are comprised of up to 100% sustainable raw materials by mass. The 2D PCB have potential applications in producing novel composites for fuel-efficient transportation, from aircraft to automobiles.

BIO:

A. Professional Preparation

University of Pittsburgh, PA
Fluorous Tech. Inc., Pittsburgh, PA
University of Iowa, Iowa City, IA
Shanghai University, P. R. China

Postdoctoral Research Scholar, 2006 – 2009
Postdoctoral Research Scholar, 2005 – 2006
Chemistry, Ph.D. 2005
Chemistry, B.Sc. 1997

B. Appointments

University of North Dakota, ND
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Associate Professor of Chemistry, 2015 - Present
Assistant Professor of Chemistry, 2009 - 2014