ENERGY, MANUFACTURING & MATERIALS FRONTIERS

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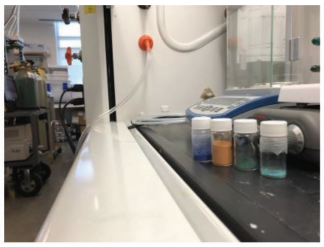
Dr. Bollini specializes in the synthesis, characterization, and mechanistic investigation of catalyst and adsorbent materials of interest to the chemical industry. He obtained his Ph.D. with Dr. Christopher Jones at Georgia Tech., and completed a postdoctoral appointment with Dr. Aditya Bhan at the University of Minnesota following an industrial experience in heterogenous catalysis research at the Dow Chemical Company. At the Cullen College of Engineering, Dr. Bollini leads a research group that is focused on understanding diffusion, adsorption, and reaction phenomena occurring in nanoporous materials at the molecular level.

ENERGY-EFFICIENT CHEMICAL PROCESSES THROUGH ATOMIC-SCALE DESIGN

The chemical industry is responsible for up to 29% of total energy consumed by U.S. manufacturing. Heterogenous catalysts allow for the selective, rapid conversion of raw materials to value-added products, and their design is key to reducing the carbon and energy footprint of chemical processes. Dr. Bollini's group focuses on the design of nanoporous materials with applications in heterogenous catalysis and adsorption. The Bollini Lab has developed a novel heterogeneous catalyst, for example, that converts abundant shale gas reserves to methanol, a versatile chemical/energy carrier. His current research projects include natural gas conversion over biomimetic catalysts, biomass conversion over complex mixed metal oxides, and CO_2 capture and conversion.



Publications

1. Hall, J.N., Bollini, P.; Enabling Access to Reduced Open-Metal Sites in Metal-Organic Framework Materials through Choice of Anion Identity: The Case of MIL-100(Cr), ACS Materials Lett. 2 (2020) 838-844.

2. Hall, J.N., Bollini, P.; Metal-Organic Framework MIL-100 Catalyzed Acetalization of Benzaldehyde with Methanol: Lewis or Bronsted Acid Catalysis? ACS Catalysis 10 (2020) 3750-3763.

3. Hall, J.N., Bollini, P.; Quantification of Open-Metal Sites in Metal –Organic Frameworks Using Irreversible Water Adsorption, Langmuir 36 (2020) 1345-1356.

4. Hall, J.N., Bollini, P.; Structure, characterization, and catalytic properties of open-metal sites in metal organic frameworks, React. Chem. Eng. 4 (2019) 207-222.

5. Afrin, S., Bollini, P.; Cerium Oxide Catalyzes the Selective Vapor Phase Hydrodeoxygenation of Anisole to Benzene at Ambient Pressures of Hydrogen, Ind. Eng. Chem. Res. 58 (2019) 14603-14607.