Brian M. Murphy

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Education

University of Delaware — Newark, DE
Doctoral Candidate, *Advisor: Dr. Bingjun Xu* (GPA: 3.6/4.0) — **Aug 2013 – Present**

University of Virginia — Charlottesville, VA
B.S. in Chemical Engineering (GPA: 3.6/4.0) — **May 2013**

Research

University of Delaware, *PI: Dr. Bingjun Xu* — **January 2014 - Present**
Thesis Topic: Mechanistic Study of and Rational Design of a Catalytic Material for the Dehydration of Methyl lactate to Acrylates

- Utilized *in situ* and *operando* FTIR spectroscopy to observe surface-adsorbate interactions to draw inferences about mechanistic pathways in this important biomass-related reaction
- Performed catalyst activity studies in a custom microreactor with on-line sampling to confirm the mechanistic insights obtained from IR and characterization studies
- Applied the results of the mechanistic study to rationally design a new class of highly active and selective catalysts for lactate dehydration
- Identified and fully investigated a novel gas-solid ion exchange process between adsorbed organic molecules and alkali-metal form zeolites with broad potential applications
- **Expertise:** High vacuum infrared spectroscopy, microreactor design and construction, reaction engineering, gas chromatography, catalyst characterization
- **Skills and Proficiencies:** FTIR, XRD, TPD, N_2 adsorption, and other characterization techniques. Working knowledge of MATLAB, ASPEN Plus and HYSYS, data analysis software (including Igor, Origin, and Excel), and Microsoft Office

University of Virginia, *PI: Dr. Gary Koenig* — **August 2012-May 2013**

- Identified, synthesized, and performed physical and electrochemical characterizations of new anode materials for a lithium-ion battery containing an aqueous electrolyte

University of South Carolina, *PI: Dr. Branko Popov* — **May-August 2012**

- *NSF Research Experience for Undergraduates*: synthesized and characterized ultra-low loading platinum on carbon composite catalysts for PEM fuel cell cathodes

Industry Experience

Air Products and Chemicals, Inc. — Allentown, PA
Graduate Intern in the Chief Engineer's Office — **July – September 2016**

- Designed and developed a dynamic model of a Temperature Swing Adsorption (TSA) unit operation using AspenTech's HYSYS software package
- Collaborated with a multi-national team to identify and satisfy appropriate design specifications and incorporate the TSA model into a pre-existing model of a complete Air Separation Plant, used for the production of high purity N_2, O_2 and Ar