

DUSTIN R. CUMMINS

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PROFESSIONAL PREPARATION.

Ph. D. Expected Dec, 2014 Chemical Engineering, University of Louisville, Louisville, KY

M.Eng. 2009 Chemical Engineering, University of Louisville, Louisville, KY

B.S. 2008 Chemical Engineering, University of Louisville, Louisville, KY

Dissertation: "Phase Transformation in transition metal chalcogenide nanowires"

Advisor: M. K. Sunkara

Thesis Title: "Synthesis of Molybdenum oxide nanowires and their facile conversion to Molybdenum sulfide"

Advisor: M. K. Sunkara

PUBLICATIONS

1. **D. R. Cummins**, R. Kappera, A. Martinez, J. Jasinski, H. Yamaguchi, M. Chhowalla, M. K. Sunkara, A. Mohite, and G. Gupta, "Improved MoS₂ Nanowires as Electrocatalyst for Hydrogen Production", *In Preparation*.
2. **D. R. Cummins**, H. B. Russell, M. Menon, J. Jasinski, And M. K. Sunkara, "Iron Sulfide (FeS) Nanotubes Using Sulfurization of Hematite Nanowires", *Nano Letters*, 13(6), 2013.
3. B. Pandit, T. Luitel, **D. R. Cummins**, A. K. Thapa, T. Druffel, F. Zamborini, and J. Liu, "Spectroscopic investigation of Photoinduced Charge Transfer Processes in FTO/TiO₂/N719 Photoanodes with and without Covalent Attachment through Silane-based Linkers", *Journal of Physical Chemistry A*, Just Accepted.
4. Z. Chen, **D. R. Cummins**, E. L. Clark, B. Reinecke, M. K. Sunkara, and T. F. Jaramillo, "Core-shell MoO₃-MoS₂ Nanowires for Hydrogen Evolution: A Functional Design for Electrocatalytic Materials", *Nano Letters*, 11(10), 2011.
5. M. K. Sunkara, C. Pendyala, **D. R. Cummins**, P. Meduri, J. Jasinski, V. Kumar, H. B. Russell, E. Clark, and J. H. Kim, "Inorganic nanowires: a perspective about their role in energy conversion and storage applications", *Journal of Physics D-Applied Physics*, 44(17), 2011.

TECHNICAL EXPERTISE

- Chemical Reactor Design and Construction
 - High Vacuum Applications
- Inorganic nanowire synthesis
 - Hot Filament CVD
 - Atmospheric and Vacuum Plasma
 - Nano-scale Phase Transformation
- Material Characterization.
 - SEM, XRD, Raman/PL
- UltraFast Transient Absorption Spectroscopy
- Electrochemistry
 - Photo-electrochemical water splitting
- Semiconductor Physics

- Material Science
- Laboratory and Chemical Safety

WORK EXPERIENCE

1. Los Alamos National Laboratory, Los Alamos, NM
Graduate Student Research Affiliate July 2013 – Present
 - Electrochemical testing of MoS₂ nanostructures for Hydrogen production
 - Developing new synthesis techniques for transition metal sulfide catalysts
2. Conn Center for Renewable Energy Research, University of Louisville, Louisville, KY
Graduate Research Assistant May 2008 – Present
 - Ultra-Fast Transient Absorption Spectroscopy
 - Synthesis of Metal Oxide Semiconductor Nanowires
 - Dye Sensitized Solar Cells and Photovoltaic Research
 - Material Characterization
3. The Dallas Group of America, Inc., Jeffersonville, IN
Engineering Research and Development Co-op January 2006 - August 2007
 - Laboratory Analysis of oils and chemical adsorbents
 - Troubleshooting industrial scale reactors, filtration, and drying equipment
 - Researching and reporting on improved methods of spray drying
 - Independently managing project deadlines and reports
 - Collaborating with operators and maintenance staff
 - Biodiesel purification research
 - Developing computer programs using VBA

PROFESSIONAL PRESENTATIONS

2013 Materials Research Society Fall Meeting, “Iron Sulfide (FeS) Nanotubes Using Sulfurization of Hematite Nanowires”, Boston, MA – Poster Presentation

2012 Materials Research Society Fall Meeting, “Transformation of Hematite Nanowires to One Dimensional Pyrite Nanostructures”, Boston, MA – Poster Presentation (Honorable Mention)

2012 Electrochemical Society PRiME Meeting, “Synthesis of Phase Pure Pyrite Nanowires/Nanotubes for Solar Energy Applications”, Honolulu, HI – Oral Presentation

2010 Annual Meeting, American Institute of Chemical Engineers, “Phase Transformation of Iron Oxide Nanowires to Iron Sulfide”, Salt Lake City, UT – Oral Presentation

AFFILIATIONS AND ORGANIZATIONS

Professional:

- Tau Beta Pi: The Engineering Honor Society
- Electrochemical Society
- Material Research Society
- American Institute of Chemical Engineers

Personal:

- Triangle Fraternity
 - Alumni Advisor to Louisville Chapter
- Freemasonry