Matthew Scott Faber

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Madison, WI 53706

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HIGHLIGHTS

- Broad, multidisciplinary, adaptable skill set that includes electrical device fabrication and measurement
- Comprehensive training in inorganic materials synthesis and characterization
- Strength in oral and written communication toward diverse audiences
- Awarded the National Science Foundation Graduate Research Fellowship

EDUCATION

- **Doctor of Philosophy in Materials Chemistry** (Anticipated June 2014)
  University of Wisconsin–Madison (Madison, WI)
  Adviser: Song Jin
  Thesis Title: "Earth-Abundant Transition Metal Chalcogenide Materials for Renewable Energy Applications"
  - Overall GPA: 4.000 / 4.000
  - Major GPA: 4.000 / 4.000

- **Bachelor of Science in Chemistry, Minor in Mathematical Sciences** (December 2008)
  The University of Texas at Dallas (Richardson, TX)
  Adviser: Kenneth J. Balkus, Jr.
  Senior Thesis Title: "Synthesis of Carbon Nanotubes and Europium(II) Oxide Nanorods"
  - Overall GPA: 3.957 / 4.000
  - Major GPA: 3.951 / 4.000
  - *Summa Cum Laude*
  - Chemistry Departmental Honors with Distinction

- **International Baccalaureate Graduate** (May 2004)
  Plano East Senior High School (Plano, TX)
  - Advanced Placement Scholar with Distinction
  - National Honor Society Graduate

RESEARCH EXPERIENCE

- **NSF Graduate Research Fellow**, University of Wisconsin–Madison November 2009 – Present
  Adviser: Song Jin
  - Developed the synthesis of cobalt pyrite (CoS_2) thin films on glass and demonstrated their use as an improved counter electrode for quantum dot-sensitized solar cells
  - Designed and executed the preparation of metal chalcogenide nanostructures on a variety of substrates for catalyzing electrochemical reduction reactions central to renewable energy applications
  - Planned, set up, and managed a complete solar cell, semiconductor photoelectrode, and catalyst characterization laboratory, including the training of new users
  - Developed and demonstrated a general electron-beam lithography procedure for the electrical characterization of sub-10 nm diameter semiconductor nanowires
  - Mentored two undergraduate students and several new graduate students

- **Undergraduate Research Assistant**, The University of Texas at Dallas January 2008 – December 2008
  Adviser: Kenneth J. Balkus, Jr.
  - Demonstrated the zeolite template-assisted microwave synthesis of carbon nanofibers
  - Synthesized europium oxide nanorods toward the preparation of electrospun white light emitting fibers

RELEVANT SKILLS AND INSTRUMENT PROFICIENCIES

Solar Cell Fabrication and Characterization
Electrochemistry and Semiconductor Photoelectrochemistry
Scanning Electron Microscopy (including EDS and E-Beam Lithography)
Schlenk Line/Air-Sensitive Chemistry
Nanoscale Electrical Device Fabrication
Chemical Vapor Deposition
Transmission Electron Microscopy
X-Ray Diffraction

HONORS AND AWARDS

R. A. Glenn Award – American Chemical Society, Division of Energy and Fuels (Awarded for the most innovative and interesting paper presented)	September 2013
Graduate Student–Faculty Liaison Committee Travel Grant – University of Wisconsin–Madison, Department of Chemistry	April 2013
National Science Foundation Graduate Research Fellowship Program, Awardee	April 2010
Pei Wang Fellowship – University of Wisconsin–Madison, Department of Chemistry	September 2009 – May 2010
National Science Foundation Graduate Research Fellowship Program, Honorable Mention Awardee	April 2009
American Society for Engineering Education SMART Scholarship For Service, Alternate Awardee	April 2009
EnCana Student Award – EnCana Corp., Calgary, Alberta, Canada	August 2005 – May 2008
Academic Honors Scholarship – The University of Texas at Dallas	August 2004 – May 2008
Erik Jonsson School of Engineering and Computer Science Academic Excellence Scholarship – The University of Texas at Dallas	August 2004 – May 2007

TEACHING AND OUTREACH

UW–Madison PEOPLE Program, Photolithography Module Co-Leader/Developer	July 2013
Fundamentals of Analytical Science (for Chemistry Majors), Teaching Assistant	January 2013 – May 2013
Fundamentals of Analytical Science (for Non-Majors), Teaching Assistant	September 2012 – December 2012
Fundamentals of Analytical Science (for Chemistry Majors), Teaching Assistant	January 2010 – May 2010
General Chemistry, Teaching Assistant	September 2009 – December 2009

* Note: All teaching assignments involved organizing and leading discussion, laboratory, and problem-solving sessions

PROFESSIONAL DEVELOPMENT AND AFFILIATIONS

Cultural Competence in Research Mentoring Workshop	July 2013
Wisconsin Entrepreneurial Boot Camp	June 2013
Research Mentor Training Seminar	June 2012 – July 2012
Communicating Chemistry to the General Public	September 2011 – December 2011
Member, American Chemical Society	

REFERENCES

Prof. Song Jin
University of Wisconsin–Madison
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608-262-1562
Graduate Research Adviser

Prof. John C. Wright
University of Wisconsin–Madison
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608-262-0351
Thesis Committee Member

Prof. Kenneth J. Balkus, Jr.
The University of Texas at Dallas
balkus@utdallas.edu
972-883-2659
Undergraduate Research Adviser

PUBLICATIONS, PRESENTATIONS, AND CONFERENCES

Four publications in peer-reviewed journals and three presentations at technical conferences and symposia – see the attached Appendix for a full list of publications, presentations, and conferences

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APPENDIX

PUBLICATIONS

1. Faber, M. S.; Dziedzic, R.*; Lukowski, M. A.; Jin, S. Metal chalcogenide nanostructures for electrocatalytic reduction reactions. *In preparation.* * Co-authored with mentored undergraduate student
2. Faber, M. S.; Park, K.; Cabán-Acevedo, M.; Santra, P. K.; Jin, S. Earth-Abundant Cobalt Pyrite (CoS_2) Thin Film on Glass as a Robust, High-Performance Counter Electrode for Quantum Dot-Sensitized Solar Cells. *J. Phys. Chem. Lett.* **2013**, *4*, 1843–1849.
3. Selinsky, R. S.; Ding, Q.; Faber, M. S.; Wright, J. C.; Jin, S. Quantum Dot Nanoscale Heterostructures for Solar Energy Conversion. *Chem. Soc. Rev.* **2013**, *42*, 2963–2985.
4. Cabán-Acevedo, M.; Faber, M. S.; Tan, Y.; Hamers, R. J.; Jin, S. Synthesis and Properties of Semiconducting Iron Pyrite (FeS_2) Nanowires. *Nano Lett.* **2012**, *12*, 1977–1982.
5. Yan, C.; Higgins, J. M.; Faber, M. S.; Lee, P. S.; Jin, S. Spontaneous Growth and Phase Transformation of Highly Conductive Nickel Germanide Nanowires. *ACS Nano* **2011**, *5*, 5006–5014.

PRESENTATIONS AND CONFERENCES

- Earth-abundant cobalt pyrite (CoS_2) thin film on glass as a robust, high-performance counter electrode for quantum dot-sensitized solar cells. 246th ACS National Meeting, Indianapolis, IN (paper 122; oral and poster presentations) — September 2013
- Electronic Transport in Nanoengineered Materials, The University of Chicago — September 2010
- Synthesis of carbon nanotubes via the microwave treatment of $(Cp^*)_2CoOH$. 13th Annual Chem-Bio Symposium, The University of Texas at Dallas, Dallas, TX (poster presentation) — March 2008
- Synthesis of carbon nanotubes via the microwave treatment of $(Cp^*)_2CoOH$. 1st Annual Undergraduate Research Poster Competition, The University of Texas at Dallas, Dallas, TX (poster presentation) — February 2008