

KEVIN V. HAGEDORN, Ph. D.

41260 Aldea Dr. Northville, MI 48167

Phone: 734-673-8405 E-mail: khagedor@umich.edu

SUMMARY

- Graduated with a Ph. D. in materials chemistry with research experience relevant to battery technologies, fuel cells, and solar energy conversion systems
- Prepared photoelectrodes for solar cells using electrochemical techniques such as anodic etching and metal assisted chemical etching
- Evaluated the photoresponses and catalytic efficiency of photoelectrodes at liquid and metal interfaces using Mott-Schottky ($C-V$) and current voltage ($J-V$) measurements
- Applied SEM optical imaging to assess the surface morphology of electrode materials
- Utilized digital simulations and experimental measurements to create better models for predicting the performance of nanostructured solar energy conversion systems

RESEARCH EXPERIENCE

Post-Doc Research Scientist, IMRA America 2010 - Present

Supervisor: Dr. Bing Liu

- Contact for details

Graduate Student, University of Michigan 2008 - 2010

Advisor: Prof. Stephen Maldonado

- Analyzed experimental data and numerical simulations to predict efficiency of nanostructured photoelectrodes as a function of minority carrier diffusion length, surface recombination velocity, and dopant density
- Reported the first example of macroporous p-type gallium phosphide and investigated its ability to perform photosynthetic water splitting
- Built a time-resolved microwave system to quantify minority carrier recombination rates from which semiconductor surface defect concentration can be inferred
- Collected experimental and numerical simulation data to determine the extent that catalytic rate affects energy conversion efficiency in semiconductor-liquid heterojunctions modified by metal nanoparticles
- Applied scanning electron microscopy (SEM) to assess the surface morphology of prepared electrodes

Graduate Student, University of Michigan 2005-2008

Advisor: Prof. Theodore Goodson III

- Characterized charge transfer kinetics in organic chromophores and metal nanoclusters for use in dye-sensitized solar cells by ultra-fast fluorescence and absorbance measurements

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Undergraduate Research Assistant, University of Michigan 2003 - 2005

Advisors: Prof. John Barker, Prof. Omar Yaghi

- Utilized *ab initio* calculations to model HOONO decomposition in the troposphere
- Synthesized metal organic frameworks for hydrogen storage applications

Undergraduate Research Assistant, Cornell University 2003

Advisor: Prof. Hector Abruña

- Investigated Pt-Pb ordered intermetallics as a catalyst for oxidation of formic acid in fuel cells

EDUCATION

Ph. D. in Materials Chemistry, University of Michigan 2010

Thesis: "Experimental Studies and Numerical Simulations on Light-Harvesting Devices"

Graduate research advisors: Prof. Stephen Maldonado and Prof. Theodore Goodson III

B. S. in Chemistry and Biochemistry, University of Michigan 2005

Thesis: "HOONO Formation and Degradation Kinetics in the Troposphere"

Undergraduate research advisors: Prof. John Barker

GPA: 3.73 (3.87 Chemistry)

AWARDS

Angell Scholar, University of Michigan 2003

Awarded for receiving all A/A- grades during 2 or more consecutive semesters

Merck Index Award, University of Michigan 2005

Awarded to outstanding undergraduate researchers in chemistry

PROFESSIONAL MEMBERSHIP

Alpha Chi Sigma 2002 - Present

American Chemical Society 2005 - Present

Electrochemical Society 2010 - Present

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PUBLICATIONS

1. Hagedorn, K.; Collins, S.; Maldonado, S.; "Preparation of Macroporous p-GaP Photoelectrodes" *J. Electrochem. Soc.* **2010**, 157(11), D588-D592.
2. Hagedorn, K.; Forgacs, C.; Collins, S.; Maldonado, S. "Design Rules for Nanowire Heterojunctions in Solar Energy Conversion/Storage Applications" *J. Phys. Chem. C* **2010**, 114, 12010.
3. Hagedorn, K.; Varnavski, O.; Hartwig, J.; Goodson, T. "Exciton Trapping in an Organic Dendrimer Possessing No Energy Gradient" *J. Phys. Chem. C* **2008**, 112, 2235.
4. Bhaskar, A.; Ramakrishna, G.; Hagedorn, K.; Varnavski, O.; Mena-Osteritz, E.; Bäuerle, P.; Goodson, T. "Enhancement of Two-Photon Absorption Cross-Section in Macrocyclic Thiophenes with Cavities in the Nanometer Regime" *J. Phys. Chem. B* **2007**, 111, 946.

PRESENTATIONS

Electrochemical Society Fall Meeting (oral)	2010
American Chemical Society Fall Meeting (oral)	2010
American Chemical Society Spring Conference (poster)	2008
University of Michigan Vaughn Symposium (poster)	2007 – 2009
Cornell Center for Materials Research Symposium (poster)	2003