

Sudarat (Susu) Lee

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Education

University of Michigan, Ann Arbor, MI

Ph.D. Candidate in Chemistry

Advisor: Dr. Stephen Maldonado

Thesis: Phosphide-based Semiconductor Nanostructures for Solar Energy Conversion

April 2017 (Expected)

Purdue University, West Lafayette, IN

Bachelor of Science in Chemistry (ACS accredited), minor in Forensic Science

Graduated in Purdue Chemistry Honors Program with Highest Distinction

Advisor: Dr. Chen Yang

Thesis: Metal-Graphene-Cell Interaction and its Potential Surgical Applications

2009-2012

Awards and Honors

- Rackham One-Term Dissertation Fellowship 2016
- U of Michigan Department of Chemistry Winter Term Fellowship 2015
- Milton Tamres Outstanding Teaching Award 2014
- Rackham Graduate Student Research Grant Award 2014
- Purdue University College of Science Outstanding Student (Chemistry) 2012
- R. Stuart Tobias Merit Scholarship for Outstanding Senior in Chemistry 2012
- Summer Undergraduate Research Award 2011
- Purdue Summer Undergraduate Research Fellowship (SURF) 2011
- John Leighty Scholarship for technical excellent in Chemistry 2011-2012
- JANDOS Scholarship (Women in Science Program) 2011-2012
- Ben Freiser Award for top student in Analytical Chemistry I 2010-2011
- Purdue University Dean's List and Semester Honors 2009-2012

Related Experiences

Research

- Graduate Researcher in Photoelectrochemistry with Prof. Stephen Maldonado 2012-present
 - Established a simple, benign chemical-vapor-deposition system (CVD) to prepare binary and ternary phosphides nanowires
 - Developed top-down and bottom-up preparation of p-GaP nanostructure platforms for precise doping, electrocatalysis, and dye-sensitized photoelectrochemical applications. This also served as a study model for subsequent bottom-up GaP nanowires synthesis and functionalization
 - Well-trained in scanning electron microscopy, high-resolution and analytical transmission electron microscopy, Auger nanoprobe and X-ray photoelectron spectroscopy, electrochemical techniques, UV-vis spectroscopy, powder X-ray diffraction, micro-Raman spectroscopy
- Undergraduate Researcher in Nanoscience with Prof. Chen Yang 2010-2012
 - Validated characteristics and physical properties of silicon nanowires prepared by metallorganic CVD
 - Studied interaction of CVD-grown graphene with cultured bone cells
 - Certified in cancer cell culture, MTT colorimetric assay
 - Well-trained in fluorescent confocal microscopy
- Summer Undergraduate Research Fellow (SURF) Summer 2011
 - Functionalized metallorganic CVD-grown silicon nanowires with amine and folate groups for cellular binding and uptake studies

Teaching and Chemical Education Course Development

- Graduate Student Mentor 2015-present
 - Provided technical guidance to undergraduate students in projects related to photoelectrochemical characterizations of nanostructured p-GaP electrodes and CdSe quantum dots synthesis
- Graduate Student Instructor at University of Michigan 2012-2016

Courses taught: CHEM 216 *Structure and Reactivity Laboratory*, CHEM 211 *Investigations in Chemistry*, CHEM 241/242 *Introduction to Chemical Analysis and Laboratory*, CHEM 230 *Physical Chemical Principles and Applications*, CHEM 125 (*Research-based*) *Hybrid Perovskite Photovoltaic Cells*

- Conducted laboratory and discussion sessions to help students to connect and apply the concepts learned from lectures
- Developed and improved chip fabrication protocol for microfluidics lab for CHEM 242 and experimental protocols for research-based CHEM 125
- Undergraduate Teaching Assistant at Purdue University Forensic Science Program Spring 2012
 - Conducted laboratory sessions for ENTM 318 Criminalistics and assisted the students in learning the critical techniques for evidence processing as well as legal report writing

Industry/Work

- Intern in Knowles Electronics (M) Sdn. Bhd. Summer 2012
Supervisor: Mr. P. Y. Ng (Department: Quality Assurance/Section: Failure Analysis)
 - Investigated the root cause of microphone failure in hearing aid devices
- Purdue Span Plan Adult Student Tutor (Chemistry, Calculus & Statistics) 2010-2012
 - Assisted undergraduate students who were a parent or experienced a minimum 3-year break before attending higher education in their studies
- Chemistry Lecture Demonstration Lab Assistant 2011-2012
 - Prepared chemistry demos for lectures to help students understand more about the basic as well as complex chemical theory

Research Presentations

Oral Presentations

- MRS 2016 Fall Meeting, Boston 2016
Macroporous p-GaP Photocathodes Prepared by Anodic Etching and ALD Doping
- Bowling Green University (Invited by Prof. Ksenija Glusac) 2015
- 227th ECS Meeting, Chicago 2015
Preparation of Photoactive ZnSnP₂ Semiconductor Nanowires

Poster Presentations

- Gordon Research Conference: Solar Fuels, Lucca, Italy 2016
- Michigan Green Up Chemistry, Ann Arbor, MI 2015
- Karle Symposium (at University of Michigan) 2015, 2016
- Materials Research Society Spring Meeting, San Francisco, CA 2015
- Vaughan Symposium (at University of Michigan) 2013, 2014
- Summer Undergraduate Research Symposium, West Lafayette, IN 2011

Publications

1. Lee, S.; Bielinski, A.; Hlynchuk, S.; Dasgupta, N.; Maldonado S. Non-surface specific dye attachment *via* thin metal oxide films on p-GaP photocathode prepared by atomic layer deposition. *In preparation*.
2. Fahrenkrug, E.;* Panda, D. K.;* Lee, S.; Bartlett, B. M.; Maldonado, S. Comparison of Various C back contact on HTM-less Lead Perovskite Photovoltaic Device. *In preparation*.
3. Ileka, K. M.; Lee, S.; Morris, M.; Håkansson, K. On-chip mixing for colorimetric quantification of salicylic acid in agar microfluidic channels: An undergraduate laboratory experiment. *Manuscript prepared*.
4. Lee, S.; Wen, W.; Maldonado, S. Comparison of GaP nanowires grown from Au and Sn vapor-liquid-solid catalysts as photoelectrode materials. **2017**. *Manuscript submitted*.
5. Ma, L.; Lee, S.; DeMuth, J.; Maldonado, S. Direct electrochemical deposition of crystalline silicon nanowires at T ≥ 60 °C. *RSC Adv.* **2016**, *6*, 78818-78825.
6. Lee, S.; Bielinski, A.; Fahrenkrug, E.; Dasgupta, N.; Maldonado S. Macroporous p-GaP photocathodes prepared by anodic etching and atomic layer deposition doping. *ACS Appl. Mater. Interfaces*. **2016**, *8*, 16178-16185.
7. Lee, S.; Fahrenkrug, E. J.; Maldonado, S. Synthesis of photoactive ZnSnP₂ semiconductor nanowires. *J. Mater. Res.* **2015**, *30*, 2170.
8. Zhang, W.; Lee, S.; McNear, K. L.; Chung, T. F.; Lee, S.; Lee, K.; Crist, S.; Ratliff, T. L.; Zhong, Z.; Chen, Y. P.; Yang, C. Use of grapheme as protection film in biological environments. *Sci. Rep.* **2014**, *4*, 4097.

Professional Affiliations and Service

- **Alpha Chi Sigma Chemistry Professional Fraternity, Professional Member** 2012-present
- **American Chemical Society (National), Student Member** 2009-present
- **Females Excelling More in Math, Engineering and the Sciences (FEMMES), Capstone Activity Coordinator** 2015-present
- Karle Symposium Committee, Editor 2015-2016
- Alpha Chi Sigma Chemistry Professional Fraternity, Alumni Secretary 2011-2012
- American Chemical Society Student Affiliate, Treasurer 2009-2012
- Women in Science Programs (WISP), Mentor 2010-2012

Volunteer Experiences

- FEMMES After School Outreach Activities 2014-present
- Michigan Math and Science Scholars: Dye-Sensitized Solar Cells (as Instructor) Summer 2015, 2016
- University of Michigan Chemistry Recruiting Weekend (as Student Host) 2013-2016
- Wea Ridge Elementary Science Fair (as Judge) 2012
- Chemistry Demo at Selma Middle & High School; Boston Middle School 2011-2012
- Purdue Science Olympiad (as Event Coordinator) 2011
- Indiana State Fair (as Booth coordinator/Demo master) 2010
- Elementary School Science Outreach (as Demo master) 2010-2011
- Purdue Homecoming & SpringFest (as Booth coordinator/Demo master) 2010-2012
- Lafayette Regional Science Fair (as Judge) 2010-2012
- National Chemistry Week (as Demonstrator) 2009-2010

References

- Prof. Stephen Maldonado, Graduate Research Advisor smald@umich.edu Phone: 734-647-4750
- Prof. Chen Yang, Undergraduate Research Advisor yang@purdue.edu Phone: 765-496-3346