

Junsi Gu

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Education

University of Michigan 2009.09 - present
Ph.D candidate in Department of Chemistry GPA: (total to date) 8.33/9.0

Advisor: Dr. Stephen Maldonado

Thesis: Study Surface Chemistry at Nanostructured Semiconductor Interfaces by Surface-Enhanced Raman Spectroscopy (tentative)

Fudan University, China 2005.09 - 2009.07
Bachelor of Science in Department of Materials Science GPA: 3.63/4.0

Advisor: Dr. Yanlei Yu

Thesis: Self-assembly of Azopyridine-containing Diblock Copolymer and its Photo-/pH-responsive Behaviour

City University of Hong Kong 2007.01 - 2007.05
Exchange student in Department of Biology and Chemistry GPA: 4.0/4.3

Work Experience

RESEARCH

Research Assistant 2010.01 - present

Department of Chemistry, University of Michigan

Advisor: Dr. Stephen Maldonado

Bench-top electrodeposition of crystalline semiconductor using low m.p. metal cathode

- Electrodeposited size-tunable crystalline Ge nanowires from aqueous GeO₂ using In nanoparticle catalysts at room temperature under ambient pressure.
- Fabricated Li ion battery anode using as-prepared Ge nanowires, and achieved comparable capacity and cyclability to Ge nanowires prepared by conventional high temperature methods.

Surface chemistry at semiconductor interface via surface-enhanced Raman spectroscopy

- Prepared CdSe and CdTe ultrathin films on SERS-active substrate via electrochemical atomic layer deposition.
- Observed direct bonding evidence in SERS for various aromatic thiols adsorbed on CdTe monolayer.
- Investigated the bonding nature of the Cd-S bond based on the potential-dependent Raman shift of the surface vibration and adsorbate vibration modes.
- Performed density functional theory calculation on the vibronic and energetic details of the thiol-semiconductor surface bonding under varied external field conditions, and extracted quantitative values for surface dipoles and bonding energetics.

Research Assistant (Rotation) 2009.09 - 2009.12
Department of Chemistry, University of Michigan
Advisor: Dr. Bart Bartlett

Intercalation of aromatic amines into perovskite-structured KLaNb_2O_7

- Developed hydrothermal approaches for the intercalation of aromatic amines into perovskite-structured KLaNb_2O_7 .
- Determined the crystal structure and interlayer bonding using powder X-ray diffraction and infrared spectroscopy.

Research Assistant 2008.06 - 2009.06
Xi Yuan Undergraduate Research Project
Department of Materials Science, Fudan University
Advisor: Dr. Yanlei Yu

UV-responsive behavior of azopyridine-containing diblock copolymeric self-assembly

- Synthesized PEO-azopyridine containing amphiphilic block-polymer by atomic transfer radical polymerization method.
- Prepared self-assembled vesicles of the block-polymers under appropriate concentration, temperature and solvent conditions.
- Observed multi-responsive properties of the vesicle structure under ultraviolet light illumination and pH variation.

Research Assistant 2007.08 - 2008.12
Department of Materials Science, Fudan University
Advisor: Dr. Xiaoli Cui

Water splitting using carbon-doped TiO_2 under visible light illumination

- Fabricated carbon-doped TiO_2 thin films by annealing the TiC nano-particles electrophoretically deposited on the Ti substrate.
- Achieved enhancement in the photo-response of the prepared thin films in the visible light region.
- Studied the influence of various preparation parameters such as deposition time, annealing temperature on the photo-responsive properties of carbon-doped TiO_2 thin films, and acquired the optimal fabrication condition.

TEACHING

Graduate Student Mentor, CHEM 216 2011.01 – 2011.04
Department of Chemistry, University of Michigan
Supervisor: Dr. Ginger Shultz

- Assisted the training of new graduate student instructors (GSI).
- Observed new GSIs' classes and provided teaching resources and strategies.
- Prepared quiz materials for the instructor.

Graduate Student Instructor, CHEM 211, CHEM 215/216 2009.09 - 2010.12
Department of Chemistry, University of Michigan
Supervisor: Dr. Masato Koreeda, Dr. Kyoungmoo Koh, Dr. Kathleen Nolte

- Provided guidance in the 200-level organic chemistry lab.

- Assisted the students to develop basic skills for data analysis and professional writing.

SERVICES

<i>Poster session judge</i>	2012.08, 2010.08
Vaughan Symposium at University of Michigan	
<i>Volunteer and lab coordinator</i>	2012.02
Future Undergraduates in Energy Program at University of Michigan	
<i>Assistant Secretary</i>	2006.09-2007.01
Department of Common Welfare, Student Committee of Fudan University	
<i>Organizer</i>	2006.05
Hematopoietic Stem Cell (HSC) Donation Campaign at Fudan University	

Awards & Honors

<i>Travel awards for poster presentation at Vaughan symposium</i>	2012.08, 2011.07
University of Michigan	
<i>Awards for oral presentation at Detroit Section of the Electrochemical Society Meeting</i>	2012.06
Detroit Section of the Electrochemical Society	
<i>Chemistry Research Excellence Awards fellowship</i>	2011.12
University of Michigan	
<i>Peter A.S. Smith Fellowship</i>	2011.06
University of Michigan	
<i>Outstanding Student of Fudan University</i>	2008.12
Fudan University	
<i>People's Scholarship</i>	2006 - 2009
Fudan University	

Publications

Gu, J.; Collins, S. M.; Carim, A. I.; Hao, X.; Bartlett, B. M.; Maldonado, S. "Template-Free Preparation of Crystalline Ge Nanowire Film Electrodes via an Electrochemical Liquid-Liquid-Solid Process in Water at Ambient Pressure and Temperature for Energy Storage" *Nano Lett.*, **2012**, 12, 4617-4623

Carim, A. I.; **Gu, J.;** Maldonado, S. "Overlayer Surface-Enhanced Raman Spectroscopy for Studying the Electrodeposition and Interfacial Chemistry of Ultrathin Ge on a Nanostructured Support" *ACS Nano*. **2011**, 5, 1818-1830

Lin, L.; Yan, Z.; **Gu, J.;** Zhang, Y.; Feng, Z.; Yu Y. "UV-responsive Behavior of Azopyridine-containing Diblock Copolymeric Vesicles: Photoinduced Fusion, Disintegration and Rearrangement" *Macromol.Rapid Commun*. **2009**, 30, 1089-1093 (Cover Page)

Presentations

Oral presentation

- Detroit Section of the Electrochemical Society Meeting, Ypsilanti, MI.* 2012.06
Gu, J.; Collins, S. M.; Carim, A. I.; Hao, X.; Bartlett, B. M.; Maldonado, S. “Room Temperature Preparation of Functional Crystalline Ge Semiconductor Nanowires by Electrochemical Liquid-Liquid-Solid Growth”
- 219th ECS Meeting, Montreal, QC Canada* 2011.05
Carim, A. I.; **Gu, J.;** Maldonado, S. “Borrowed' SERS Effect for Monitoring Ge Electrodeposition and Surface Chemistry in Real Time”
- National Conference on Solar Energy and Photo-catalysis, Shanghai, China* 2008.11
Gu, J.; Cui, X. “Carbon-doped TiO₂ Thin Film Fabricated by Electrophoretic Deposition of TiC and its Photoresponse under Visible Light Illumination”
- Poster presentation
- 2012 Vaughan Symposium, University of Michigan, Ann Arbor, MI* 2012.08
Gu, J.; Collins, S. M.; Carim, A. I.; Hao, X.; Bartlett, B. M.; Maldonado, S. “Room Temperature Fabrication of Crystalline Germanium Nanowire Thin Film by Electrochemical Deposition and its Application as Li Ion Battery Anode”
- 2012 Gordon Research Seminar on Electrochemistry, Ventura, CA* 2012.01
Gu, J.; Maldonado, S. “Study of Chemisorbate Bonding at Nanostructured Semiconductor Interfaces via Surface Enhanced Raman Spectroscopy Combined with Density Functional Theory”
- 2011 Vaughan Symposium, University of Michigan, Ann Arbor, MI* 2011.07
Gu, J.; Maldonado, S. “Surface-Enhanced Raman Spectroscopy Platforms for Studying Surface Chemistry at Nanostructured Semiconductor interfaces”
- Aldrich Symposium in Materials Science, Ann Arbor, MI* 2010.10
Gu, J.; Carim, A. I.; Maldonado, S. “Surface-Enhanced Raman Spectroscopy Platforms for Studying Chemical Processes at Nanostructured Semiconductor Interfaces”