

Master of Engineering

Education Background

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| 10/2015~03/2019 | Division of Precision Science & Technology and Applied Physics, Osaka University (OU) | Osaka, Japan |
| | M.Eng. in Precision Science & Technology | GPA: 3.6/4.0 |
| 09/2011~06/2015 | College of Materials Science and Engineering, Jilin University (JLU) | Changchun, China |
| | B.Eng. in Materials Science and Engineering | GPA: 3.3/4.0 |

Research Experiences

- 10/2015~03/2019 **Chemical Etching of a Semiconductor Surface assisted by Single Sheets of Reduced Graphene Oxide in Water** **OU**
M.Eng. Project **Funded by the Japan Society for the Promotion of Science (JSPS) (No. JP24686020)** **Advisor: A/Prof. Kenta Arima**
- Established the experimental system including the synthesis of reduced graphene oxide (rGO), the etching system and characterization methods, independently. & Employed rGO as a chemical tool for nano-machining of a Ge surface in water. & Published a paper in *ECS Transactions*.
 - Proved that the dissolved O₂ is responsible for the enhanced etching of Ge surface assisted by rGO. & Characterized the obtained rGO by Raman Spectroscopy. & Characterized the etched Ge surface by AFM. & Analyzed the relationship between characteristic length of rGO sheets and the etching rate. & Supposed the possible reaction mechanism of the etching process. & Published a paper in *Carbon*.
 - Found water intercalation appear in the initial immersion stage by *in situ* AFM. & Elucidated the reaction sequence of enhanced etching of Ge surfaces in water with the assistance of rGO sheets by *in situ* AFM. & Submitted a paper to *Materials Science in Semiconductor Processing*.
 - Obtained clear atomic resolution images of rGO sheets by STM with ultrahigh vacuum and in room temperature. & Understood the electronic properties around rGO edges by STM and STS. & Preparing a paper.
- 02/2017~03/2019 **Study on Large-area Collective Formation Method of Parallel Type Nanogap Structure** **OU**
M.Eng. Project **Funded by the Japan Society for the Promotion of Science (JSPS) (No. JP26630026)** **Advisor: A/Prof. Kenta Arima**
- Established the experimental system including the step/terrace fabrication, Ag nanoparticles adsorption and etching experiments, independently.
 - Studied the changes of step/terrace structures influenced by dissolved O₂ concentration in water. & Discussed the influencing factor in Ag nanoparticles adsorption process and found that high concentration of dissolved O₂ plays a negative role in adsorption process.
 - Fabricated the nanogap structures successfully. & Characterized the nanogap structures by AFM. & Preparing a paper.
 - Found a balance effect between the dissolution of Ag nanoparticles and the etching of Si(111) surface assisted by Ag nanoparticles.
- 09/2014~06/2015 **The Preparation of a Novel TiO₂ Impregnated Dickite Photocatalyst Using Expanded Dickite as Carrier** **JLU**
B.Eng. Project **Funded by Natural Scientific Foundation of China (No. 41472035, 51304080)** **Advisor: A/Prof. Bing Xue**
- Prepared a novel TiO₂ impregnated dickite photocatalyst using expanded dickite as carrier by sol-gel method and hydro-thermal method. & Analyzed the formation of compounds particles under different reaction conditions by XRD and infrared spectroscopy.
 - Observed the obtained particles by SEM. & Measured the surface area of the obtained particles by specific surface area test.
 - Characterized photocatalytic efficiency of obtained particles by UV-vis. & Evaluated the relationship between surface modification of TiO₂ and its photocatalytic efficiency. & The related research results were published in *RSC Advances*.
- 06/2013~08/2014 **One-Pot Synthesis of Zeolite P from Coal Fly Ashes and Its Application in Water Purification** **JLU**
Core Member **Funded by Natural Scientific Foundation of China (No. 21101046)** **Advisor: A/Prof. Qian Gao**
- Synthesized zeolite P first time via a one-pot hydrothermal process using coal fly ashes of circulating fluidized bed produced by the circulating fluidized bed boiler (CFBB) without extra active pretreatment, and sodium silicate and sodium hydroxide were also used as precursor.
 - Characterized the as-prepared samples by means of XRD, nitrogen adsorption measurements, TG, IR and SEM. & Proved the obtained zeolite P has excellent water purification potential of removing organic contaminants, methylene blue (MB). & Submitted a paper to *Nanomaterials*.

Publications

- **S. Li**, K. Nakade, T. Hirano, K. Kawai, and K. Arima, "Investigation of reaction sequence occurring in graphene-assisted chemical etching of Ge surfaces in water", *Materials Science in Semiconductor Processing*. (Revised manuscript under review)
- T. Hirano, K. Nakade, **S. Li**, K. Kawai, and K. Arima*, "Chemical Etching of a Semiconductor Surface Assisted by Single Sheets of Reduced Graphene Oxide", *Carbon*, vol. 127, p. 681-687, 2018.
- **S. Li**, T. Hirano, K. Kawai, K. Yamamura, and K. Arima, "Graphene-assisted Chemical Etching of Ge surfaces in Water ~*In situ* Observations of the Etching Process~", *The 65th The Japan Society of Applied Physics (JSAP) Spring Meeting*, Tokyo (Japan), 03/2018. (Oral, in Japanese)
- **S. Li**, T. Hirano, K. Kawai, K. Yamamura, and K. Arima, "Graphene-assisted Chemical Etching of Semiconductor surfaces ~STM Observations of the Reduced Graphene Oxide Sheets~", *2018 The Japan Society of Precision Engineering (JSPE) Spring Meeting*, Tokyo (Japan), 03/2018. (Oral, in Japanese)
- **S. Li**, T. Hirano, K. Nakade, K. Kawai, K. Yamamura, and K. Arima, "*In situ* Observations of the Etching Process on Ge surfaces Assisted by Reduced Graphene Oxide Sheets", *2017 3rd JSAP Meeting in Kansai*, Osaka (Japan), 02/2018. (Poster, in Japanese)
- **S. Li**, T. Hirano, K. Nakade, K. Kawai, and K. Arima, "Scanning Probe Microscopy Observations of Intercalation Effect on Graphene-assisted Chemical Etching of Ge Surfaces in Water", *25th International Colloquium on Scanning Probe Microscopy (ICSPM 25)*, Shizuoka (Japan), 12/2017. (Poster, in English)
- **S. Li**, T. Hirano, K. Nakade, K. Kawai, and K. Arima, "STM Observations of the Reduced Graphene Oxide Sheets", *2017 JSPE Autumn Meeting*, Osaka (Japan), 09/2017. (Oral and Poster, in Japanese)
- K. Nakade, T. Hirano, **S. Li**, Y. Saito, D. Mori, M. Morita, K. Kawai, and K. Arima*, "Formation of Etch Pits on Germanium Surfaces Loaded with Reduced Graphene Oxide in Water", *ECS Transactions*, vol. 77, p. 127-133, 2017.
- **S. Li**, T. Hirano, K. Nakade, K. Kawai, and K. Arima, "Nanoscale Observations of the Reduced Graphene Oxide Sheets by STM", *2017 JSPE Meeting in Kansai*, Osaka (Japan), 06/2017. (Poster, in Japanese)

Extracurricular Activities

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| 09/2017 | Volunteer | The Japan Society of Precision Engineering (JSPE) |
| ➤ Prepared for the conference halls. & Helped conference participants as a guide. & Evaluated the presentations as a time keeper. | | |
| 11/2014~01/2015 | Experimental Assistant | The State Key Laboratory of Inorganic Synthesis and Preparation, JLU |
| ➤ Tested the photocatalytic efficiency of C ₃ N ₄ nanoparticles. & Studied operation methods of SEM and knowledges about gas sensitive materials. | | |
| 09/2012~04/2013 | Tour Guide Volunteer | Jilin Provincial Museum, China |
| ➤ Explained the history about artifacts in this museum for tourists. & Maintained the museum clean after one day exhibition. | | |

Honors and Awards

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| ➤ Otsuka Toshimi Foundation Scholarship | 04/2017~03/2019 |
| ➤ Recommendation of Excellent Graduation Thesis of JLU | 06/2015 |
| ➤ Jilin University Scholarship | 09/2014~06/2015 |
| ➤ Second Prize, National University Student Innovation Program | 06/2013 |
| ➤ Jilin University Scholarship | 09/2011~06/2012 |

Skills

- **Proficient** in STM, AFM, XRD, SEM, TEM, EDS, Raman Spectrum, BET Surface Area Measurements and Origin, ChemSketch.
- **Familiar** with UV-vis, Infrared Spectroscopy, Ultraclean Room Technology, Vacuum Knowledge, Auto CAD, Illustrator and PhotoShop.

Languages

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| English | College English Test (CET-4 & CET-6(highest)), TOEIC-725 | Fluent |
| Japanese | The Japanese-Language Proficiency Test (JLPT) N1 Level (highest) | Fluent |
| Chinese | | Native |