Dong Yoon Shin

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EDUCATION

UNIVERSITY OF TOKYO Tokyo, Japan
Master of Science, Department of Physics, Graduate School of Science. GPA 4.00/4.00 March 2014

YOKOHAMA NATIONAL UNIVERSITY Yokohama, Japan
Bachelor of Engineering, Division of Physics, Faculty of Engineering. GPA 3.73/4.50 March 2012

RESEARCH EXPERIENCE

INSTITUTE FOR ADVANCED ENGINEERING (IAE) Yongin, South Korea
Senior Researcher, Materials Science & Chemical Engineering Center April 2014 – July 2019

- Worked as a Technical Research Personnel, alternative to national military service (April 2014 – April 2017)
- Designed and performed research in the fields of applied physics and chemistry, materials science, and environmental engineering
- Researched semiconductor-based photocatalysts to enhance photocatalysis under visible light by surface modification, combination with other semiconductors, and coupling with metal ions
- Synthesized, characterized, and applied metal and semiconductor nanoparticles, quantum dots, and oxide dispersion-strengthened alloys
- Developed up-cycling methods for wastes from LCD, LED, NiMH batteries, smart glass, and slag
- Improved purification process for $TiCl_4$ and heavy rare earth elements (Tm, Yb, and Er)
- Designed, fabricated, and applied a radio-frequency thermal plasma system to synthesize high-purity nanoparticles

UNIVERSITY OF TOKYO Tokyo, Japan
Graduate Student, Hasegawa Research Group (Surface Science) April 2012 – March 2014

- Studied atomic structures, electronic states, and electronic transport at surface states by controlling surface superstructures in ultrahigh vacuum using electron diffraction, scanning tunneling microscopy, photoemission spectroscopy, and four-point probes
- Researched the interactions between the surface two-dimensional electron states and magnetic adatoms in dilute magnetic surface systems by conducting surface-sensitive and temperature-dependent resistivity measurements to examine the two-dimensional Kondo effect and RKKY interactions
- Supported research by the Hasegawa Research Group, including on the Rashba effect, weak anti-localization, two-dimensional superconductors, topological insulators, and silicene

YOKOHAMA NATIONAL UNIVERSITY Yokohama, Japan
Undergraduate Student, Kaoru Ohno Lab (First-Principles Calculation) April 2011 – March 2012

- Studied fundamentals of *ab-initio* calculations and the all-electron mixed-basis approach to condensed matter physics
- Participated in a project for developing the Tohoku Mixed-Basis Orbitals *ab-initio* program (TOMBO), an advanced all-electron mixed-basis *ab-initio* code for density functional theory (DFT)-based calculations

SELECTED JOURNAL ARTICLES (9 of 13)

"Combining surface-fluorinated TiO_2 hollow spheres and WO_3 nanoparticles for highly efficient photocatalysis under visible light," **Dongyoon Shin**, Duk-Hee Lee, Chan-Gi Lee, Kyung-Soo Park, Submitted.

"Facile synthesis of single-phase alpha-tungsten nanopowders from ammonium paratungstate by RF induction thermal plasma and thermochemicals," **Dongyoon Shin**, Hyun-Woo Shim, Basudev Swain, Kyung-Soo Park, Chan-Gi Lee, Korean Journal of Metals and Materials, Vol. 58 (2020) 798-807.

"Comparison of different tungsten precursors for preparation of tungsten nanopowder by RF induction thermal plasma," **Dongyoon Shin**, Basudev Swain, Chulwoong Han, Yonghwan Kim, Chan-Gi Lee, Kyung-Soo Park, International Journal of Refractory Metals and Hard Materials, Vol. 86 (2020) 104995.

"One-pot wet chemical synthesis of fluorine-containing TiO_2 nanoparticles with enhanced photocatalytic activity," Duk-Hee Lee, Basudev Swain, **Dongyoon Shin**, Nak-Kyoon Ahn, Jae-Ryang Park, Kyung-Soo Park, Materials Research Bulletin, Vol. 109 (2019) 227-232.

"Synthesis of submicron silver powder from scrap low-temperature co-fired ceramic e-waste: Understanding the leaching kinetics and wet chemistry," Basudev Swain, **Dongyoon Shin**, So Yeong Joo, Nak Kyoon Ahn, Chan-Gi Lee, Jin-Ho Yoon, Chemosphere, Vol. 194 (2018) 793-802.

"Selective recovery of silver from waste low-temperature co-fired ceramic and valorization through silver nanoparticles," Basudev Swain, **Dongyoon Shin**, So Yeong Joo, Nak Kyoon Ahn, Chan-Gi Lee, Jin-Ho Yoon, Waste Management, Vol. 69 (2017) 79-87.

"Development of high-strength glass-ceramic materials by utilization of slag discharged from the steel-making industry in Korea," **Dongyoon Shin**, Duk-Hee Lee, Mijung Yoon, Hyun Seo Park, Sung Mo Seo, Jin-Ho Yoon, Science of Advanced Materials, Vol. 8 (2016) 2295-2298.

"Recycling of waste automotive laminated glass and valorization of polyvinyl butyral through mechanochemical separation," Basudev Swain, Jae Ryang Park, **Dong Yoon Shin**, Kyung-Soo Park, Myung Hwan Hong, Chan-Gi Lee, Environmental Research, Vol. 142 (2015) 615-623.

"*In situ* magnetotransport measurements in ultrathin bi films: Evidence for surface-bulk coherent transport," Masaki Aitani, Toru Hirahara, Satoru Ichinokura, Masahiro Hanaduka, **Dongyoon Shin**, and Shuji Hasegawa, Physical Review Letters, Vol. 113 (2014) 206802.

SELECTED RESEARCH PROJECTS at IAE (7 of 21)

"Development of commercial system for detoxification/recycling of LCD/LED waste glass and automatic plant for disassembly/sorting of waste displays," funded by Ministry of Environment, Republic of Korea (Project No. 2016002250005), 2016–2019.

"Development of high purity TiO_2 manufacturing technology for white color paints application from ilmenite ore," funded by Ministry of Trade, Industry, and Energy, Republic of Korea, (Project No. 20152510101950), 2015–2019.

"Development of manufacturing techniques for high purity (3N5) tungsten powder from tungsten (more than 95%) wastes," funded by Ministry of Trade, Industry, and Energy, Republic of Korea (Project No. 20165020301260), 2016–2018.

"Development of technology for recovery of high purity silver and production of silver nanopowder from electrode by-products," funded by Ministry of Trade, Industry, and Energy, Republic of Korea, (Project No. 20155020101140), 2015–2017.

"Development of highly sensitive and functional organic/inorganic hybrid plastic composite for LED," funded by Ministry of Trade, Industry, and Energy, Republic of Korea (Project No. R0004019), 2015–2017.

"Continuous production technology of granular titanium metal," funded by the Ministry of Trade, Industry, and Energy, Republic of Korea (Project No. 10063143), 2016–2018.

"Development and commercialization of the recycling technologies, recovery efficiency above 95% and purity 99.999% of the Ga & In from the LED wastes," funded by the Ministry of Trade, Industry, and Energy, Republic of Korea (Project No. 20135020100930), 2015–2016.

PATENTS

"Method for manufacturing tungsten metal nanopowder of single alpha-tungsten phase," KR20200081723A, Priority 2018-12-28.

"Method for manufacturing tungsten trioxide nanopowder using RF plasma," KR20200081724A, Priority 2018-12-28.

"Method for recovering silver from by-products generated in the electrode manufacturing process," KR101951352B1, Granted 2019-02-22, Priority 2017-09-08.

"Film-glass separating plant for recycling waste glass and treating method," KR101781132B1, Granted 2017-09-22, Priority 2016-03-17.

"Shearing device of film-glass separating plant to separate film and glass for recycling waste glass," KR101758881B1, Granted 2017-07-14, Priority 2016-03-17.

"Method for leaching gallium from LED scraps," KR20170009144A, Priority 2015-07-15.

SELECTED INTERNATIONAL CONFERENCE PRESENTATIONS (11 of 15)

"A study on F-TiO_2-WO_3 photocatalyst with enhanced visible light photocatalytic activity," 5th International Conference on Electronic Materials and Nanotechnology for a Green Environment (ENGE), 2018.

"Synthesis of flower-like $Cu_3(MoO_4)_2O$ microspheres by simple aqueous precipitation and its application for Li-ion batteries," 5th International Conference on Electronic Materials and Nanotechnology for a Green Environment (ENGE), 2018.

"A study on high purity tungsten nanoparticle preparation through RF induction thermal plasma and the hydrogen reduction process," International Union of Materials Research Societies – International Conference on Electronic Materials (IUMRS–ICEM), 2018.

"Synthesis and characterization of TiO_2 nanoparticles with different morphologies using AHFT as a starting material," Fall Conference of Korean Powder Metallurgy Institute incorporating 2nd International Symposium on Innovation in Materials Processing (ISIMP), 2017.

"Silver recovery as nanoparticles from LTCC by-products," 4th International Conference on Electronic Materials and Nanotechnology for Green Environment (ENGE), 2016.

"The preparation and property control of zinc oxide nanoparticles on non-aqueous medium," 9th International Conference on Quantum Dots, 2016.

"Synthesis of quantum dots using the continuous micro-reactor method," 4th International Conference of Advances in Functional Materials (AFM), 2016.

"Recovery of indium powders from indium chloride solutions by leaching, enrichment, and cementation," 3rd 3R International Scientific Conference on Material Cycles and Waste Management (3RINCs), 2016.

"Size and shape control of metal nanoparticles in one-pot synthesis," 20th International Vacuum Congress (IVC), 2016.

"Study on high functional abrasive-resistant materials using slag for industrial application," 14th International Union of Materials Research Societies – International Conference on Advanced Materials (IUMRS–ICAM), 2015.

"Electrical conductivity of a dilute magnetic surface superstructure on Si(111)," 14th International Conference on the Formation of Semiconductor Interfaces (ICFSI), 2013.

HONORS & AWARDS

- **Monbukagakusho Honors Scholarship**, granted by Japan Student Services Organization (JASSO) 2012, 2013
- **Korea-Japan Joint Government Scholarship** for Students in Science and Engineering, granted by governments of Korea and Japan to qualified Korean students to study in Japan, five-year scholarship of full tuition and stipend 2007 – 2011
- **Best Presentation Award**, Fall Conference of Korean Powder Metallurgy Institute incorporating 2nd International Symposium on Innovation in Materials Processing (ISIMP) 2017
- **Best Poster Award**, International Union of Materials Research Societies – International Conference on Advanced Materials (IUMRS–ICAM) 2015

TEACHING EXPERIENCE

UNIVERSITY OF TOKYO Tokyo, Japan

Teaching Assistant (TA) October 2012 – March 2013

- TA for "Experiments in Physics II – Electron Diffraction" given by Professor Shuji Hasegawa

Mentor for Graduation Research of Undergraduate Student in Physics October 2012 – March 2013

- Guided an undergraduate student for his required research in the Hasegawa Research Group

YOKOHAMA NATIONAL UNIVERSITY Yokohama, Japan

Physics Tutor for Prospective International Students October 2011 – March 2012

- Taught weekly physics class to six prospective international students

VOLUNTEER ACTIVITIES

- Tutor for international students in Division of Physics, Yokohama National University 2010 – 2011
- Service Civil International – South Korea (SCI–Korea), participated in volunteering projects 2009 – 2010
- International Student Center at Yokohama National University, supported international students 2008 – 2011

LANGUAGE PROFICIENCY

- Fluent in **English** and **Japanese**; Native in **Korean**
- TOEFL iBT: 103-105 (Reading: 30, Listening: 27, Speaking: 21-23, Writing: 25)

QUALIFICATIONS

- **Surface Science Engineer**, qualified by the Japan Society of Vacuum and Surface Science

REFERENCES

Shuji Hasegawa, Professor
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