Sangtae Kim

Associate Professor
Department of Nuclear Engineering
Department of Materials Science and Engineering
College of Engineering
Hanyang University
Seoul 05108, Republic of Korea
https://stkim.hanyang.ac.kr/
sangtae@hanyang.ac.kr

Table of Contents

Last updated: Apr. 2026

I. Earned Degrees

Ph.D.	June 2016	Massachusetts Institute of Technology (MIT)	*Materials Science and Engineering* Minor in Computational Science · Advisor: Prof. Ju Li
B.S.	May 2010	University of California, Berkeley	*Materials Science and Engineering* Emphasis in Materials Physics

II. Employment History

Associate Professor	Department of Nuclear Engineering Hanyang University, Seoul, Korea	*Mar. 2024–present*
Assistant Professor	Department of Nuclear Engineering Hanyang University, Seoul, Korea	*Mar. 2020–Feb. 2024*
Sr. Research Scientist	Center for Electronic Materials Korea Institute of Science and Technology (KIST), Seoul, Korea	*Sep. 2018–Feb. 2020*
Researcher	Center for Electronic Materials Korea Institute of Science and Technology (KIST), Seoul, Korea	*Jul. 2016–Aug. 2018*
Student Assistant	Materials Science Division Lawrence Berkeley National Laboratory, Berkeley, CA	*Jul. 2007–May 2010*

III. Honors and Awards

1. Young Scientist Award, Hanyang University, 02/2026
2. Excellent Presentation Award, Korean Society of Pressure Vessels and Piping, 11/2025
   Co-recipients: Ho-A Kim (Ph.D. Student), Ho Lee (Ph.D. Student), Seongwon Ham (Ph.D. Student), Minho Kim (M.S. Student), Choah Kwon (Postdoctoral Researcher)
3. Young Scientist Award, Hanyang University, 02/2025
4. Young Scientist Award, Hanyang University, 02/2024
5. Outstanding Presentation Award, Korea Nuclear Society, 10/2023
6. Outstanding Presentation Award, The Korean Association for Radiation Protection, 10/2023
   Co-recipients: Seongwon Ham (Ph.D. Student)
7. Young Scientist Award, iCANX Foundation, 12/2021
8. Best Teacher Award, Hanyang University, 06/2021
9. Best Poster Award, Materials Research Society 2015 Spring Meeting, 04/2015
10. Finalist, MADMEC Prototype Contest, MIT, 04/2014
11. Samsung Scholarship, 11/2009
12. Outstanding Undergraduate Award, Electronic Materials Symposium, 04/2009
13. Elaine C. Shen Memorial Prize Award, UC Berkeley, 03/2009

IV. Research, Scholarship, and Creative Activities

A. Refereed Publications and Submitted Articles

A.1. Submitted Manuscripts

[1] Ho Lee, Kwanghee Lee, Liang Qi*, **Sangtae Kim***. Interpretable and Transferable Machine Learning for Solute Segregation in γ-Fe Grain Boundaries. 2026. *(submitted)*

[2] Beom Gwon Son, Hye Ryung Byon, **Sangtae Kim***, Eun Seon Cho*. Stabilizing Lithium Metal Anodes via Tuned Li^+–π Interactions in Nanoporous Porous Aromatic Framework–Coated Separators. 2026. *(submitted)*

[3] Hyeonwoo Kim, Heejin Park, Han Lim Cha, Tae-Hyeong Kim, Jong-Yun Kim, **Sangtae Kim***. Divergent Structural Organization Trends Driven by Oxygen Speciation in Uranium-Bearing Chloride Molten Salts. 2026. *(submitted)*

[4] Jin-Sung Park, Weiyin Chen, Choah Kwon, Moonsu Yoon, Hyojun Lim, Landon James Kilgallon, Sungjin Yang, So Yeon Kim, Sung-Eun Suh, **Sangtae Kim**, Jeremiah A. Johnson, Ju Li*. Synergistic Hybrid Electrolytes: Blending Sulfonamide and Ether-Based Solvents for Stable Lithium Metal Batteries. 2026. *(submitted)*

[5] Jihun Kim, Wonseok Yang, Sujeong Lee, Heejin Park, Hyeonwoo Kim, Taehoon Park, Saehyun Choi, Junwon Kim, Joonsoo Ock, **Sangtae Kim**, Sungyeol Choi*. Method for Measuring Moisture Concentration in $MgCl_2$-Containing Molten Salts and Its Impact on Materials Corrosion. 2026. *(submitted)*

[6] Ki Ryuk Bang, Choah Kwon, **Sangtae Kim***, Eun Seon Cho*. Asymmetric Pore Engineering in Covalent Organic Framework Membrane for Effective Osmotic Energy Conversion. 2026. *(submitted)*

[7] Hyeonwoo Kim, Ho Lee, Kanghyeon Kim, Yue Fan, **Sangtae Kim***, Miaomiao Jin*, Yang Yang*. Kinetic Interplay between Chemical Short-Range Order and Grain Boundaries in NiCoCr Alloys under Irradiation. *Materials Research Letters (accepted)*, 2026. *(submitted)*

[8] Sungjun Choi, Ho-A Kim, **Sangtae Kim***. Impact of Recrystallization on Hydrogen-Sensitive Creep in Zirconium Alloy Cladding. 2026. *(submitted)*

A.2. Published and Accepted Journal Articles

[1] Seongwon Ham, Choah Kwon, Minho Kim, Han Lim Cha, Ho-A Kim, Jong-Il Yun, Jun Woo Park, Jongwoo Lee, Seung Yop Paek, Jinsuo Zhang, Ju Li*, **Sangtae Kim***. Corrosion-Resistant Coatings in Molten Salts Suggested by Computational Phase-Stability Diagrams. *Acta Materialia*, 309, pp. 122063, 2026.

[2] Siyoung Choi, Sung-Woo Kim, **Sangtae Kim**, Minsung Hong*. Integrated the Rupture Disk Corrosion Test (RDCT) and Finite Element Analysis (FEA) approach for evaluating PWSCC initiation in Alloy 600 under simulated pressurized water reactors conditions. *Nuclear Engineering and Technology*, 58 (5), pp. 104138, 2026.

[3] Kanghyeon Kim, Ho Lee, Minho Kim, Seongwon Ham, Amanda Leong, Matthew Si, Woohyuk Lee, Hyeon-Kyo Song, Wonyoung Choi, Jinsuo Zhang*, **Sangtae Kim***. Materials design for Tellurium capture to prevent corrosion in molten salt reactors via atomic-scale thermodynamic modeling and experimental validation. *Journal of Nuclear Materials*, 624, pp. 156478, 2026.

[4] Dong-Gyu Lee, Seung Hyeon Kong, Yi-Yeon Kim, Seung-Bum Kim, Iman M. Imani, Hyun Soo Kim, Jeong Min Baik, Heemin Kang, Sahn Nahm, Sunghoon Hur, Yongke Yan, **Sangtae Kim***, Kyung-Hoon Cho*, Hyun-Cheol Song*. UV-activated seed strategy for promoting textured colossal grain growth in templated ceramic processing. *Journal of the European Ceramic Society*, 46 (3), pp. 117851, 2026.

[5] Hyeonwoo Kim, Choah Kwon, Hyeri Yoo, Jihye Baek, Dongwhi Kim, JinHyeok Cha*, **Sangtae Kim***. Molecular insights into co-solvent and water duality in amine-based CO_2 absorption via neural network-based atomistic simulations. *Chemical Engineering Journal*, 525, pp. 169980, 2025.

[6] Ho-A Kim, Mincheol Kim, **Sangtae Kim**, Sungjun Choi. Effects of Ar Ion Irradiation on Mechanical Properties and Microstructure of SA508 Grade 3 Class 1 and Class 2 Reactor Pressure Vessel Steels. *Materials*, 18 (19), pp. 4601-4601, 2025.

[7] Ho-A Kim, Mincheol Kim, Sungjun Choi, **Sangtae Kim***. Effects of Ar Ion Irradiation on Mechanical Properties and Microstructure of SA508 Grade 3 Class 1 and Class 2 Reactor Pressure Vessel Steels. *Materials*, 18 (19), pp. 4601, 2025.

[8] Hyesung Lee, Changjoon Keum, Choah Kwon, **Sangtae Kim**, Youngdo Jeong*, Sang-Yup Lee*. Coordination Geometry Tuning in a Single-Atom Nanozyme to Mimic Metalloenzymes with Nonplanar Active Site. *Advanced Science*, 12 (34), pp. e05733, 2025.

[9] Gichang Noh, Jeongho Kim, Dong Yeon Woo, Min-gyu Kim, Hyeri Yoo, Han Beom Jeong, Yooyeon Jo, Eunpyo Park, Dae Kyu Lee, Min Jee Kim, Min-kyung Jo, In Soo Kim, Talip Serkan Kasirga, Dong Han Ha, Soo Young Kim, Gyu Weon Hwang, **Sangtae Kim**, Chul-Ho Lee, Heejun Yang, Hu Young Jeong, Kibum Kang*, Joon Young Kwak*. Electrolyte-free potassium ions intercalated in 2D layered metal oxide for imitating spatiotemporal biological neural dynamics. *Materials*

Today, 85, pp. 27–38, 2025.

[10] Han Kim, Taeseok Kim, Minseok Kim, Jihoon Jeon, Gwang Min Park, Sung-Chul Kim, Sung Ok Won, Ryosuke Harada, **Sangtae Kim**, Seong Keun Kim*. Selective Surface Passivation for Ultrathin and Continuous Metallic Films via Atomic Layer Deposition. *Nano Letters*, 25 (10), pp. 4101–4107, 2025.

[11] Kyungmin Kim, Minseung Ko, **Sangtae Kim**, Yongsoo Kim*. A study on in-situ characterization technology development for clearance verification of radioactive waste from nuclear decommissioning. *Annals of Nuclear Energy*, 211, pp. 110945, 2025.

[12] Taeseok Kim, Han Kim, Seung Ho Ryu, Gwang Min Park, Sung-Chul Kim, Sung Kwang Lee, Taek-Mo Chung, Sung Ok Won, Jeong Hwan Han, **Sangtae Kim**, Seong Keun Kim*. Inhibitor-Assisted Atomic Layer Deposition for Uniformly Doped Ultrathin Films: Overcoming Compositional and Thickness Limitations. *Chemistry of Materials*, 37 (2), pp. 796–805, 2025.

[13] Hyesun Kim, HyeonJi Kim, Wonsik Kim, Choah Kwon, Si-Won Jin, Taejun Ha, Jae-Hyeok Shim, Soohyung Park, Aqil Jamal, **Sangtae Kim***, Eun Seon Cho*. Facile synthesis of nanoporous Mg crystalline structure by organic solvent-based reduction for solid-state hydrogen storage. *Nature Communications*, 15 (1), pp. 10800, 2024.

[14] Seongmin Jin, Choah Kwon, Aram Bugaev, Bartu Karakurt, Yu-Cheng Lin, Louisa Savereide, Liping Zhong, Victor Boureau, Olga Safonova, **Sangtae Kim**, Jeremy S. Luterbacher*. Atom-by-atom design of Cu/ZrOx clusters on MgO for CO2 hydrogenation using liquid-phase atomic layer deposition. *Nature Catalysis*, 7 (11), pp. 1199–1212, 2024.

[15] Emre Tekoglu*, Jong-Soo Bae*, Ho-A Kim*, Kwang-Hyeok Lim, Jian Liu, Tyler D. Doležal, So Yeon Kim, Mohammed A. Alrizqi, Aubrey Penn, Wen Chen, A. John Hart, Joo-Hee Kang, Chang-Seok Oh, Jiwon Park, Fan Sun, **Sangtae Kim***, Gi-Dong Sim*, Ju Li*. Superior high-temperature mechanical properties and microstructural features of LPBF-printed In625-based metal matrix composites. *Materials Today*, 80, pp. 297–307, 2024.

[16] Han Kim, Taeseok Kim, Hong Keun Chung, Jihoon Jeon, Sung-Chul Kim, Sung Ok Won, Ryosuke Harada, Tomohiro Tsugawa, **Sangtae Kim***, Seong Keun Kim*. Sustained Area-Selectivity in Atomic Layer Deposition of Ir Films: Utilization of Dual Effects of O$_3$ in Deposition and Etching. *Small*, 20 (46), pp. 2402543, 2024.

[17] Ho-A Kim, Sungjun Choi, Yong-Soo Kim, Jiwon Park, Joo-Hee Kang*, **Sangtae Kim**. The influence of solid solution hydrogen and precipitated hydride on the creep behavior of Zircaloy-4. *Journal of Nuclear Materials*, 600, pp. 155244, 2024.

[18] Jinseok Koh, Choah Kwon, Hyunjeong Kim, Eunchong Lee, Akihiko Machida, Yuki Nakahira, Yun Jeong Hwang, Kouji Sakaki, **Sangtae Kim***, Eun Seon Cho*. Defect-Driven Evolution of Oxo-Coordinated Cobalt Active Sites with Rapid Structural Transformation for Efficient Water Oxidation. *ACS Nano*, 18 (42), pp. 28986–28998, 2024.

[19] Namyoung Gwak, Seungki Shin, Hyeri Yoo, Gyeong Won Seo, Seongchan Kim, Hyunwoo Jang, Minwoo Lee, Tae Hwan Park, Byong Jae Kim, Jaehoon Lim, Soo Young Kim, **Sangtae Kim***, Gyu Weon Hwang*, Nuri Oh*. Highly Luminescent Shell-Less Indium Phosphide Quantum Dots Enabled by Atomistically Tailored Surface States. *Advanced Materials*, 36 (36), pp. 2404480, 2024.

[20] Beom Gwon Son, Choah Kwon, YongJun Cho, Taegyu Jang, Hye Ryung Byon, **Sangtae Kim***, Eun Seon Cho*. Constructing Reversible Li Deposition Interfaces by Tailoring Lithiophilic Functionalities of a Heteroatom-Doped Graphene Interlayer for Highly Stable Li Metal Anodes. *ACS Applied Materials & Interfaces*, 16 (25), pp. 32259–32270, 2024.

[21] Jongmin Bae, Choah Kwon, See-On Park, Hakcheon Jeong, Taehoon Park, Taehwan Jang, Yoonho Cho, **Sangtae Kim***, Shinhyun Choi*. Tunable ion energy barrier modulation through aliovalent halide doping for reliable and dynamic memristive neuromorphic systems. *Science Advances*, 10 (23), pp. eadm7221, 2024.

[22] Dokyu Kang, Choah Kwon, Wonseok Yang, Seokjoo Yoon, Yunu Lee, James T.M. Amphlett, Sang-Eun Bae, **Sangtae Kim***, Sungyeol Choi*. Spectroscopic and theoretical analyses of the reaction of SrO in molten chloride and fluoride salts. *Journal of Nuclear Materials*, 592, pp. 154962, 2024.

[23] Byung Ku Jung, Hyeri Yoo, Bogyeom Seo, Hyung Jin Choi, Young Kyun Choi, Tae Hyuk Kim, Nuri Oh, Soo Young Kim, **Sangtae Kim**, Yunki Lee, Jae Won Shim, Hye Yeon Park*, Gyu Weon Hwang*, Tse Nga Ng*, Soong Ju Oh*. High-Affinity

Ligand-Enhanced Passivation of Group III–V Colloidal Quantum Dots for Sensitive Near-Infrared Photodetection. *ACS Energy Letters*, 9 (2), pp. 504–512, 2024.

[24] Dong Ju Han, Choah Kwon, YongJun Cho, Kouji Sakaki, **Sangtae Kim***, Eun Seon Cho*. Tailoring hierarchical pore structures in carbon scaffolds for hydrogen storage of nanoconfined magnesium. *Chemical Engineering Journal*, 481, pp. 148451, 2024.

[25] Ho-A Kim, Ju-Seong Kim, Yundong Lee, Sangbum Kim, Youho Lee, Yong-Soo Kim, Joo-Hee Kang*, **Sangtae Kim***. Microstructure and mechanical properties of hydride blisters formed on Zircaloy-4 claddings. *Journal of Nuclear Materials*, 588, pp. 154777, 2024.

[26] Dongjoon Shin, Kihoon Ryu, Daehyun Kim, Eunho Choi, Seunghoon Chae, Yundong Lee, Yong Tae Kang, **Sangtae Kim***, Wonjoon Choi*. Boosted thermogalvanic thermopower upon solid-to-liquid phase transition. *Energy & Environmental Science*, 17 (20), pp. 7712–7719, 2024.

[27] Sunghoon Hur, **Sangtae Kim**, Hyun-Soo Kim, Ajeet Kumar, Choah Kwon, Joonchul Shin, Heemin Kang, Tae Hyun Sung, Jungho Ryu*, Jeong Min Baik*, Hyun-Cheol Song*. Low-grade waste heat recovery scenarios: Pyroelectric, thermomagnetic, and thermogalvanic thermal energy harvesting. *Nano Energy*, 114, pp. 108596, 2023.

[28] Dongwoo Kang, Jiwon Park, Eunho Choi, Alloyssius E.G. Gorospe, Yongwoo Kwon, **Sangtae Kim***, Dongwook Lee*. Proportionality between electrochemical thermopower and mass fraction in PEDOT:PSS / AC model binary supercapacitor electrodes. *Materials Letters*, 346, pp. 134514, 2023.

[29] Seonghyun Park, Byungseok Seo, Dongjoon Shin, Seunghoon Chae, Hyunjoon Cho, **Sangtae Kim***, Wonjoon Choi*. Synthesis of carbon nanotube-iron oxide composites via combustion waves for hybrid Li-ion battery anodes. *Chemical Engineering Journal*, 470, pp. 144260, 2023.

[30] Ki Ryuk Bang, Choah Kwon, Ho Lee, **Sangtae Kim***, Eun Seon Cho*. Horizontally Asymmetric Nanochannels of Graphene Oxide Membranes for Efficient Osmotic Energy Harvesting. *ACS Nano*, 17 (11), pp. 10000–10009, 2023.

[31] Seungki Shin, Namyoung Gwak, Hyeri Yoo, Hyunwoo Jang, Minwoo Lee, Kyungwan Kang, Seongchan Kim, Sooyeon Yeon, Tae Ann Kim, **Sangtae Kim***, Gyu Weon Hwang*, Nuri Oh*. Fluoride-free synthesis strategy for luminescent InP cores and effective shelling processes via combinational precursor chemistry. *Chemical Engineering Journal*, 466, pp. 143223, 2023.

[32] Byungseok Seo, Youngsun Cha, Yong Choi, **Sangtae Kim***, Wonjoon Choi*. Rationally designed micropixelation-free tactile sensors via contour profile of triboelectric field propagation. *Nano Energy*, 109, pp. 108255, 2023.

[33] Hyeonwoo Kim, Choah Kwon, Seongwon Ham, Juhyung Lee, Sung Joong Kim*, **Sangtae Kim***. Physical properties of KCl-UCl3 molten salts as potential fuels for molten salt reactors. *Journal of Nuclear Materials*, 577, pp. 154329, 2023.

[34] Dong-Gyu Lee, Joonchul Shin, Hyun Soo Kim, Sunghoon Hur, Shuailing Sun, Ji-Soo Jang, Sangmi Chang, Inki Jung, Sahn Nahm, Heemin Kang, Chong-Yun Kang, **Sangtae Kim**, Jeong Min Baik, Il-Ryeol Yoo, Kyung-Hoon Cho*, Hyun-Cheol Song*. Autonomous Resonance-Tuning Mechanism for Environmental Adaptive Energy Harvesting. *Advanced Science*, 10 (3), pp. 2205179, 2023.

[35] **Sangtae Kim**, Jaehoon Choi, Hong Min Seung, Inki Jung, Ki Hoon Ryu, Hyun-Cheol Song, Chong-Yun Kang*, Miso Kim*. Gradient-index phononic crystal and Helmholtz resonator coupled structure for high-performance acoustic energy harvesting. *Nano Energy*, 101, pp. 107544, 2022.

[36] Hyeri Yoo, Kyeong-Seok Lee, Sahn Nahm, Gyu Weon Hwang*, **Sangtae Kim***. Predicting ligand-dependent nanocrystal shapes of InP quantum dots and their electronic structures. *Applied Surface Science*, 578, pp. 151972, 2022.

[37] Young Geun Song, Jun Min Suh, Jae Yeol Park, Ji Eun Kim, Suk Yeop Chun, Jae Uk Kwon, Ho Lee, Ho Won Jang, **Sangtae Kim**, Chong-Yun Kang*, Jung Ho Yoon*. Artificial Adaptive and Maladaptive Sensory Receptors Based on a Surface-Dominated Diffusive Memristor. *Advanced Science*, 9 (4), pp. 2103484, 2022.

[38] Byungseok Seo, Youngsun Cha, **Sangtae Kim***, Wonjoon Choi*. Tunable current duration in triboelectric generators via capacitive air gaps. *International Journal of Energy Research*, 45 (4), pp. 5619–5628, 2021.

[39] Jinseok Koh, Eunho Choi, Kouji Sakaki, Daeho Kim, Seung Min Han, **Sangtae Kim***, Eun Seon Cho*. Uncovering

the encapsulation effect of reduced graphene oxide sheets on the hydrogen storage properties of palladium nanocubes. *Nanoscale*, 13 (40), pp. 16942–16951, 2021.

[40] Dong Ju Han, **Sangtae Kim***, Eun Seon Cho*. Revealing the role of defects in graphene oxide in the evolution of magnesium nanocrystals and the resulting effects on hydrogen storage. *Journal of Materials Chemistry A*, 9 (15), pp. 9875–9881, 2021.

[41] Youn-Hwan Shin, Jaehoon Choi, Seong Jin Kim, **Sangtae Kim**, Deepam Maurya, Tae-Hyun Sung, Shashank Priya, Chong-Yun Kang, Hyun-Cheol Song*. Automatic resonance tuning mechanism for ultra-wide bandwidth mechanical energy harvesting. *Nano Energy*, 77, pp. 104986, 2020.

[42] In-Hwan Baek, Ah-Jin Cho, **Sangtae Kim**, Ga Yeon Lee, Jeong Hwan Han, Taek-Mo Chung, Seung-Hyub Baek, Chong-Yun Kang, Jin-Sang Kim, Cheol Seong Hwang, Seong Keun Kim*. Substrate Surface Modification for Enlarging Two-Dimensional SnS Grains at Low Temperatures. *Chemistry of Materials*, 32 (20), pp. 9026–9033, 2020.

[43] Inki Jung, Jaehoon Choi, Hye-Jeong Park, Tae-Gon Lee, Sahn Nahm, Hyun-Cheol Song, **Sangtae Kim***, Chong-Yun Kang*. Design principles for coupled piezoelectric and electromagnetic hybrid energy harvesters for autonomous sensor systems. *Nano Energy*, 75, pp. 104921, 2020.

[44] Sung Wook Paek*, Sivagaminathan Balasubramanian, **Sangtae Kim**, Olivier De Weck. Small-Satellite Synthetic Aperture Radar for Continuous Global Biospheric Monitoring: A Review. *Remote Sensing*, 12 (16), pp. 2546, 2020.

[45] Woo Chul Lee, **Sangtae Kim**, Eric S. Larsen, Jung-Hae Choi, Seung-Hyub Baek, Minji Lee, Deok-Yong Cho, Han-Koo Lee, Cheol Seong Hwang, Christopher W. Bielawski, Seong Keun Kim*. Atomic engineering of metastable BeO6 octahedra in a rocksalt framework. *Applied Surface Science*, 501, pp. 144280, 2020.

[46] Young Geun Song, Young-Seok Shim, Jun Min Suh, Myoung-Sub Noh, Gwang Su Kim, Kyoung Soon Choi, Beomgyun Jeong, **Sangtae Kim**, Ho Won Jang, Byeong-Kwon Ju, Chong-Yun Kang. Ionic-Activated Chemiresistive Gas Sensors for Room-Temperature Operation. *Small*, 15 (40), pp. 1902065, 2019.

[47] Byungseok Seo, Youngsun Cha, **Sangtae Kim***, Wonjoon Choi*. Rational Design for Optimizing Hybrid Thermo-triboelectric Generators Targeting Human Activities. *ACS Energy Letters*, 4 (9), pp. 2069–2074, 2019.

[48] HyunSeok Lee, **Sangtae Kim**, Narendra Singh Parmar, Jong-Han Song, Kyung-yoon Chung, Kwang-Bum Kim, Ji-Won Choi*. Carbon-free Mn-doped LiFePO4 cathode for highly transparent thin-film batteries. *Journal of Power Sources*, 434, pp. 226713, 2019.

[49] Hai Bo Xu, Jeong Hun Kim, **Sangtae Kim**, Hee Jae Hwang, Deepam Maurya, Dukhyun Choi, Chong-Yun Kang*, Hyun-Cheol Song*. Double layered dielectric elastomer by vapor encapsulation casting for highly deformable and strongly adhesive triboelectric materials. *Nano Energy*, 62, pp. 144–153, 2019.

[50] Hyeon Kook Seo, Jae Yeol Park, Joon Ha Chang, Kyun Sung Dae, Myoung-Sub Noh, Sung-Soo Kim, Chong-Yun Kang, Kejie Zhao, **Sangtae Kim***, Jong Min Yuk*. Strong stress-composition coupling in lithium alloy nanoparticles. *Nature Communications*, 10 (1), pp. 3428, 2019.

[51] Kai Liu, Eunjung Ko, **Sangtae Kim**, Jaehong Park, Cheol Seong Hwang, Jung-Hae Choi*. Orientation-dependent structural and electronic properties of Ge-GeO2 interfaces: first-principles study. *Journal of Physics D: Applied Physics*, 52 (15), pp. 155101, 2019.

[52] Myoung-Sub Noh, Hyunseok Lee, Young Geun Song, Inki Jung, Ruiguang Ning, Sung Wook Paek, Hyun-Cheol Song, Seung-Hyub Baek, Chong-Yun Kang*, **Sangtae Kim***. Li alloy-based non-volatile actuators. *Nano Energy*, 57, pp. 653–659, 2019.

[53] Sung Wook Paek*, **Sangtae Kim**, Olivier De Weck. Optimization of Reconfigurable Satellite Constellations Using Simulated Annealing and Genetic Algorithm. *Sensors*, 19 (4), pp. 765, 2019.

[54] Seung Yeop Yi*, Young Geun Song*, Jae Yeol Park, Jun Min Suh, Gwang Su Kim, Young-Seok Shim, Jong Min Yuk, **Sangtae Kim**, Ho Won Jang, Byeong-Kwon Ju, Chong-Yun Kang*. Morphological Evolution Induced through a Heterojunction of W-Decorated NiO Nanoigloos: Synergistic Effect on High-Performance Gas Sensors. *ACS Applied Materials & Interfaces*, 11 (7), pp. 7529–7538, 2019.

[55] Young Geun Song, Jae Yeol Park, Jun Min Suh, Young-Seok Shim, Seung Yeop Yi, Ho Won Jang, **Sangtae Kim**, Jong Min Yuk, Byeong-Kwon Ju*, Chong-Yun Kang*. Heterojunction Based on Rh-Decorated WO3 Nanorods for Morphological Change and Gas Sensor Application Using the Transition Effect. *Chemistry of Materials*, 31 (1), pp. 207–215, 2019.

[56] HyunSeok Lee, **Sangtae Kim**, Kwang-Bum Kim, Ji-Won Choi*. Scalable fabrication of flexible thin-film batteries for smart lens applications. *Nano Energy*, 53, pp. 225–231, 2018.

[57] Youn-Hwan Shin, Inki Jung, Hyunchul Park, Jung Joon Pyeon, Jeong Gon Son, Chong Min Koo, **Sangtae Kim***, Chong-Yun Kang*. Mechanical Fatigue Resistance of Piezoelectric PVDF Polymers. *Micromachines*, 9 (10), pp. 503, 2018.

[58] **Sangtae Kim***, Hyo Jin Gwon, Sung Wook Paek, Seong Keun Kim, Ji-Won Choi, Jin-Sang Kim, Jung-Hae Choi, Chong-Yun Kang*, Seung-Hyub Baek*. A novel class of oxynitrides stabilized by nitrogen dimer formation. *Scientific Reports*, 8 (1), pp. 14471, 2018.

[59] Young-Seok Shim, Ki Chang Kwon, Jun Min Suh, Kyoung Soon Choi, Young Geun Song, Woonbae Sohn, Seokhoon Choi, Kootak Hong, Jong-Myeong Jeon, Seung-Pyo Hong, **Sangtae Kim**, Soo Young Kim, Chong-Yun Kang*, Ho Won Jang*. Synthesis of Numerous Edge Sites in MoS2 via SiO2 Nanorods Platform for Highly Sensitive Gas Sensor. *ACS Applied Materials & Interfaces*, 10 (37), pp. 31594–31602, 2018.

[60] Hayoung Hwang, Kang Yeol Lee, Dongjoon Shin, Jungho Shin, **Sangtae Kim***, Wonjoon Choi*. Metal-free, flexible triboelectric generator based on MWCNT mesh film and PDMS layers. *Applied Surface Science*, 442, pp. 693–699, 2018.

[61] Youn-Hwan Shin, Inki Jung, Myoung-Sub Noh, Jeong Hun Kim, Ji-Young Choi, **Sangtae Kim***, Chong-Yun Kang*. Piezoelectric polymer-based roadway energy harvesting via displacement amplification module. *Applied Energy*, 216, pp. 741–750, 2018.

[62] Young-Seok Shim, Byungjin Jang, Jun Min Suh, Myoung Sub Noh, **Sangtae Kim**, Soo Deok Han, Young Geun Song, Do Hong Kim, Chong-Yun Kang, Ho Won Jang*, Wooyoung Lee*. Nanogap-controlled Pd coating for hydrogen sensitive switches and hydrogen sensors. *Sensors and Actuators B: Chemical*, 255, pp. 1841–1848, 2018.

[63] Myoung-Sub Noh, Soo Deok Han, Songhwa Chae, Seung Hyuk Back, **Sangtae Kim**, Seung-Hyub Baek, Seong Keun Kim, Ji-Won Choi, Jin-Sang Kim, Dong June Ahn, Dukhyun Choi*, Chong-Yun Kang*. Laser-irradiated inclined metal nanocolumns for selective, scalable, and room-temperature synthesis of plasmonic isotropic nanospheres. *Journal of Materials Chemistry C*, 6 (22), pp. 6038–6045, 2018.

[64] Young Geun Song, Young-Seok Shim, **Sangtae Kim**, Soo Deok Han, Hi Gyu Moon, Myoung Sub Noh, Kwangjae Lee, Hae Ryong Lee, Jin-Sang Kim, Byeong-Kwon Ju, Chong-Yun Kang*. Downsizing gas sensors based on semiconducting metal oxide: Effects of electrodes on gas sensing properties. *Sensors and Actuators B: Chemical*, 248, pp. 949–956, 2017.

[65] Soo Deok Han, Myoung-Sub Noh, **Sangtae Kim**, Young-Seok Shim, Young Geuon Song, Kwangjae Lee, Hae Ryung Lee, Sahn Nahm, Seok-Jin Yoon, Jin-Sang Kim, Chong-Yun Kang*. Versatile approaches to tune a nanocolumnar structure for optimized electrical properties of In2O3 based gas sensor. *Sensors and Actuators B: Chemical*, 248, pp. 894–901, 2017.

[66] Woo Chul Lee, Cheol Jin Cho, **Sangtae Kim**, Eric S. Larsen, Jung Hwan Yum, Christopher W. Bielawski, Cheol Seong Hwang, Seong Keun Kim*. Growth and Characterization of BeO Thin Films Grown by Atomic Layer Deposition Using H2 O and O3 as Oxygen Sources. *The Journal of Physical Chemistry C*, 121 (32), pp. 17498–17504, 2017.

[67] Tae-Hyeon Kil, Sanghyeon Kim, Dae-Han Jeong, Dae-Myeong Geum, Sooseok Lee, Sung-Jin Jung, **Sangtae Kim**, Chan Park, Jin-Sang Kim, Jeong Min Baik, Ki-Suk Lee, Chang Zoo Kim, Won Jun Choi*, Seung-Hyub Baek*. A highly-efficient, concentrating-photovoltaic/thermoelectric hybrid generator. *Nano Energy*, 37, pp. 242–247, 2017.

[68] Myoung-Sub Noh, **Sangtae Kim**, Do-Kyung Hwang, Chong-Yun Kang*. Self-powered flexible touch sensors based on PZT thin films using laser lift-off. *Sensors and Actuators A: Physical*, 261, pp. 288–294, 2017.

[69] Inki Jung, Youn-Hwan Shin, **Sangtae Kim**, Ji-young Choi, Chong-Yun Kang*. Flexible piezoelectric polymer-based energy harvesting system for roadway applications. *Applied Energy*, 197, pp. 222–229, 2017.

[70] Kang Pyo So, Di Chen, Akihiro Kushima, Mingda Li, **Sangtae Kim**, Yang Yang, Ziqiang Wang, Jong Gil Park, Young Hee Lee, Rafael I. Gonzalez, Miguel Kiwi, Eduardo M. Bringa, Lin Shao*, Ju Li*. Dispersion of carbon nanotubes in aluminum improves radiation resistance. *Nano Energy*, 22, pp. 319–327, 2016.

[71] **Sangtae Kim**, Soon Ju Choi, Kejie Zhao, Hui Yang, Giorgia Gobbi, Sulin Zhang, Ju Li. Electrochemically driven mechanical energy harvesting. *Nature Communications*, 7 (1), pp. 10146, 2016.

[72] Yao Zhang, Changjin Huang, **Sangtae Kim**, Mahdi Golkaram, Matthew W. A. Dixon, Leann Tilley, Ju Li, Sulin Zhang*, Subra Suresh*. Multiple stiffening effects of nanoscale knobs on human red blood cells infected with Plasmodium falciparum malaria parasite. *Proceedings of the National Academy of Sciences*, 112 (19), pp. 6068–6073, 2015.

[73] **Sangtae Kim**, Xiaohua Ma, Shyue Ping Ong, Gerbrand Ceder*. A comparison of destabilization mechanisms of the layered NaxMO2 and LixMO2 compounds upon alkali de-intercalation. *Physical Chemistry Chemical Physics*, 14 (44), pp. 15571, 2012.

[74] Shyue Ping Ong, Vincent L. Chevrier, Geoffroy Hautier, Anubhav Jain, Charles Moore, **Sangtae Kim**, Xiaohua Ma, Gerbrand Ceder*. Voltage, stability and diffusion barrier differences between sodium-ion and lithium-ion intercalation materials. *Energy & Environmental Science*, 4 (9), pp. 3680-3688, 2011.

B. Presentations (Selected)

B.1. Invited Talks

1. "Boosted Thermogalvanic Thermopower upon Solid-to-Liquid Phase Transition," International Conference on Advanced Electromaterials, Jeju, Korea, 2025
2. "Design of Ceramic Coatings against Molten Chloride Corrosion," European Ceramic Society 2025, Dresden, Germany, 2025
3. "Nanoporous Magnesium Enables Facile Hydrogen Storage Kinetics," The Electrochemical Society Meeting 2025 Montreal, Montreal, Canada, 2025
4. "Electrochemically Driven Thermal Energy Harvesting via Solid-to-Liquid Phase Transition," Materials Research Society 2025 Spring Meeting, Seattle, USA, 2025
5. "Design of Molten Salt Corrosion-Resistant Materials Utilizing Grain Boundary Precipitates," The Korean Institute of Metals and Materials 2025, Gwangju, Korea, 2025
6. "Stress-Electrochemistry Coupling for Energy Applications," iCANX Foundation, online, 2022
7. "Stress-Composition in Li Alloys," International Workshop in Piezoelectric Materials and Applications in Actuators, Lyon, France, 2019
8. "Energy Harvester Concepts Utilizing Stress-Composition Coupling in Li Alloys," International Conference on Active Materials and Soft Mechatronics, Incheon, Korea, 2019
9. "Timescale Tunability in Mechanical Energy Harvesting and Potential Materials Development," International Workshop on Nanogenerators and Piezotronics, Seoul, Korea, 2018
10. "Understanding the Difference in Intercalation Behavior between Layered Na- and Li- Transition Metal Oxides," The Electrochemical Society PRiME meeting, 2012

B.2. Conference and Poster Presentations

1. "TBD - The 12th International Conference on Multiscale Materials Modeling," The 12th International Conference on Multiscale Materials Modeling, Jeju, Korea, 2026
2. "Grain Boundary Segregation in γ-Fe for Corrosion-Tolerant Alloys in Thermal Energy Harvesting: First Principles and Machine Learning," NGPT 2026, Seoul, Korea, 2026
3. "TBD - The 12th International Conference on Multiscale Materials Modeling," The 12th International Conference on Multiscale Materials Modeling, Jeju, Korea, 2026
4. "Mechanistic Insight into Asymmetric Corrosion and Prediction of Disproportionate Mass Transfer in Molten Chloride Systems," NGPT 2026, Seoul, Korea, 2026
5. "Divergent Density Trends Driven by Oxygen Speciation in Uranium-Bearing Chloride Molten Salts," The Metals, Minerals & Materials Society Meeting 2026, San Diego, USA, 2026
6. "Quantifying Microstructure- and Impurity-Dependent Cr Dissolution in Molten Salts via Molecular Dynamics and Metadynamics," The Metals, Minerals & Materials Society Meeting 2026, San Diego, CA, USA, 2026
7. "Rationalizing the Asymmetric Corrosion in Flowing Molten Salt Loops using Computational Thermodynamics," The

Metals, Minerals & Materials Society Meeting 2026, San diego, CA, USA, 2026

8. “Engineering Grain Boundaries of Ni-Based Alloys Against Intergranular Molten Chloride Corrosion,” The Metals, Minerals & Materials Society Meeting 2026, San Diego, CA, 2026
9. “Engineering Grain Boundaries of Ni-based Alloys against Intergranular Molten Chloride Corrosion,” 2026 , , 2026
10. “Understanding the corrosion of extreme liquid-solid interfaces,” IT , Jeju, Korea, 2026
11. “Pack Cementation of Silicide Coatings on SS316L under Inert Atmosphere for Enhanced Corrosion Resistance in Molten Chlorides,” 2026 , , 2026
12. “Divergent Density Trends Driven by Oxygen Speciation in Uranium-Bearing Molten Chlorides,” 2026 , , 2026
13. “ ,” 2026 , Gyeongju, Korea, 2026
14. “Divergent Density Trends Driven by Oxygen Speciation in Uranium-Bearing Molten Chlorides ,” 2026 , , 2026
15. “Computational Analysis of Rehydration During the Solid-to-Liquid Transition in Molten Salts,” NGPT 2026, Seoul, Korea, 2026
16. “Quantifying the Effects of Local Atomic Environment and Impurities on Cr Dissolution in Molten Salts via Molecular Dynamics and Metadynamics,” 2026 , , 2026
17. “TBD - 2026 ,” 2026 , Gyeongju, Korea, 2026
18. “TBD - 2026 ,” 2026 , Gyeongju, Korea, 2026
19. “Accelerated Screening of Corrosion-Resistant Coating Materials for Molten Chlorides via Computational Phase-Stability Diagrams,” 2026 , Jeju, Korea, 2026
20. “First-Principles and Machine Learning-Based Prediction of Grain Boundary Segregation Energies of Alloying Elements in γ-Fe,” 2026 , , 2026
21. “Boosted Thermogalvanic Thermopower upon Solid-to-Liquid Phase Transition,” 2nd International Workshop on Thermoelectrochemical Devices, Tokyo, Japan, 2025
22. “Design of corrosion-resistant ceramic coatings against molten chlorides via computational thermodynamics,” The Minerals, Metals & Materials Society 2025, Las Vegas, USA, 2025
23. “Silicide-based coatings to prevent molten chloride corrosion,” The Mineral, Metals & Materials Society, Las vegas, NV, USA, 2025
24. “Predicting Elemental Segregation Tendency via Ab Initio and Machine Learning Methods,” The Minerals, Metals & Materials Society , Las Vegas, NV, USA, 2025
25. “Comparison of atomistic simulation methods for molten salt thermal property prediction,” 2025 , Busan, Korea, 2025
26. “First-Principles and Machine Learning-Based Prediction of Alloying Element Segregation and Mitigation of Oxide Formation Depending on γ-Fe Grain Boundary Properties,” Fall Annual Conference of KIM, 2025, Gwangju, Republic of Korea, 2025
27. “Can Naonocrystalline Zirconium Suppress Hydride Precipitation?,” , Jeju, Korea, 2025
28. “Molecular Dynamics Simulation of Oxygen-containing NaCl-KCl-UCl3 Molten Salt,” Korean Nuclear Society Fall Meeting, Changwon, Korea, 2025
29. “Boosted Thermogalvanic Thermopower upon Solid-to-Liquid Phase Transition,” MRS Fall 2024, Boston, USA, 2024
30. “Search for Corrosion-Resistant Alloy Coating for Molten Chloride,” Global Conference Innovation Materials 2024, Jeju, Korea, 2024
31. “Predicting Elemental Segregation Energy to Quantify Nanocrystalline Stability via Machine Learning,” The 8th International Conference on Electronic Materials and Nanotechnology for Green Environment, Jeju-do, Korea, 2024
32. “First-Principles and Machine Learning-Based Prediction of Grain Boundary Segregation Energies of Alloying Elements in γ-Fe,” Fall Annual Conference of KIM, 2024, Pyeongchang, Gangwon-do, Republic of Korea, 2024
33. “Grain Boundary Segregation Energies in γ-Fe for Robots in Molten Salt Nuclear Reactor Application,” The 20th International Conference on Ubiquitous Robots, Honolulu, Hawaii, USA, 2023

34. “Electrochemically driven Thermal Energy Harvesting,” Korean Chemical Society, Suwon, Korea, 2023
35. “Atomistic Simulations for MSR Design: Applications in Fuels and Structural Materials,” , Jeju, Korea, 2023
36. “Review of the corrosion mechanism in the spent nuclear fuel cask through the mass-balance equations and chemical reactions,” , Jeju, Korea, 2023
37. “MSR coating materials for preventing corrosion,” , Jeju, Korea, 2023
38. “Screening Corrosion-Resistant Alloy Elements in γ-Fe for Molten Salt Reactors Applications with Machine Learning Approach,” 2023 , Daegu, Seoul, 2023
39. “High-Throughput Screening of Corrosion-Resistant Alloy Elements in γ-Fe and Ni for Molten Salt Reactors,” , Jeju-do, Korea, 2022
40. “Search for N Dimer-Stabilized Oxynitrides,” ICC8, online, 2021
41. “Electrochemically driven Mechanical Energy Harvesting,” , Seoul, Korea, 2021
42. “Title to be determined,” 237th ECS Meeting, Montreal, Canada, 2020
43. “A novel class of oxynitrides stabilized by nitrogen dimer formation,” MRS Fall Meeting, Boston, USA, 2018
44. “Li Alloy based Non-Volatile Actuators,” IWPMA, Kobe, Japan, 2018
45. “Timescale Tunability in Mechanical Energy Harvesting,” Materials Challenges in Alternative and Renewable Energy, Jeju, Seoul, 2017
46. “Electrochemically driven Mechanical Energy Harvesting,” MRS Fall Meeting, Boston, USA, 2015
47. “Electrochemically driven Mechanical Energy Harvesting,” ACS National Meeting, Boston, USA, 2015
48. “Mechanical Energy Harvesters with Extended Current Pulse Duration based on Electrochemically Alloyed Electrodes,” MRS Spring Meeting, San Francisco, USA (Best Poster Award), 2015
49. “Electrochemical Device Design to Mechanical Energy Harvesting,” Materials Day at Center for Materials Science and Engineering, MIT, 2014
50. “Stability of O3 Type Layered Structure upon De-Intercalation: Effect of Li to Na Substitution,” MRS Spring Meeting, San Francisco, USA, 2012

B.3. Seminars

1. “Corrosion-Resistant Coating Materials for Molten Salts,” Dept. of Materials Science and Engineering, Yeungnam University, 2024
2. “Computational Design of Corrosion-Resistant Materials for Molten Salts,” KAERI Nuclear Chemistry Research Team, 2024
3. “Stress-Composition Coupling in Li Alloys,” UNIST, Ulsan, Korea, 2019
4. “Stress-Composition Coupling and its Applications in Energy Harvesting and Actuators,” Nano Convergence Conference (NCC), Chuncheon, Korea, 2019
5. “Energy Harvester Concepts Utilizing Stress-Composition Coupling in Li Alloys,” KIST-KINKEN Joint Workshop, Seoul, Korea, 2019
6. “Electrochemically driven Mechanical Energy Harvesting,” Dept. of Materials Science and Engineering, Sungkyunkwan University, 2016
7. “Timescale Tunability in Mechanical Energy Harvesting,” Dept. of Materials Science and Engineering, Seoul National University, 2016
8. “Computational Design of Corrosion-Resistant Materials for Molten Salts,” Dept. of Nuclear Engineering, Kyung Hee University, 11/2023
9. “Electrochemically driven Thermal Energy Harvesting,” KIST Center for Electronic Materials, 11/2022
10. “Design Strategies for Corrosion-Resistant Structural Materials in Molten Salts,” POSTECH, 07/2024
11. “Atoms Feel Stresses, too! - Let’s learn to use them.,” Dept. of Materials Science and Engineering, Pukyong National University, 07/2022
12. “Introduction to Molten Salt Reactors and Corrosion Mitigation Materials Research,” Daegu Mechatronics and Materials Institute, 06/2023
13. “Electrochemically driven Mechanical Energy Harvesting,” School of Materials Science and Engineering, UNIST, 06/2021

14. “Stress as an Effective Thermodynamic Handle for Energy Materials,” Dept. of Materials Science and Engineering, Sungkyunkwan University, 05/2022
15. “Electrochemically driven Mechanical Energy Harvesting,” Dept. of Materials Science and Engineering, Sungkyunkwan University, 04/2021

C. Grants and Contracts

*Total grants awarded: $3,807,022**

C.1. Government Funds

[1] High-retention, low-power artificial synaptic device based on two-phase equilibria among ion-insertion electrodes

Agency: National Research Foundation of Korea
Program: Young Investigator Program (Addon)
Role: PI
Budget: $52,765*
Period: 2023-07-01 – 2024-02-29

[2] Development of High-Retention, Low-Power Artificial Synaptic Devices Using Non-Equilibrium Ionic Materials

Agency: National Research Foundation of Korea
Program: Young Investigator Program
Role: PI
Budget: $183,263*
Period: 2023-03-01 – 2026-02-28

[3] Analysis of High-Temperature Material Degradation Phenomena in a Multipurpose Natural Circulation Small Molten Salt Fast Reactor through Multiscale Simulation

Agency: National Research Foundation of Korea
Program: Fundamental Nuclear Research Program
Role: PI
Budget: $560,630* (14% of Total $3,957,387*)
Period: 2021-04-15 – 2026-12-31

[4] Development of artificial neural network-based ODS cladding material and fabrication technology with excellent high-temperature creep and irradiation swelling resistance

Agency: National Research Foundation of Korea
Program: Nano & Materials Technology Program
Role: co-PI
Budget: $488,078* (11% of Total $4,611,497*)
Period: 2024-04-01 – 2028-12-31

[5] Multi-physics Innovation for Next-generation Energy with Reliable, Viable, and Advanced technology (MINERVA Hub)

Agency: Korea Institute of Energy Technology Evaluation and Planning
Program: Energy Human-Resource Development Program
Role: co-PI
Budget: $758,499* (20% of Total $3,812,283*)
Period: 2024-03-01 – 2029-12-31

[6] Development of a Multidimensional Simulation Platform for Analysis and Prediction of Ion Irradiation Damage in Fusion Structural Materials

Agency: National Research Foundation of Korea
Program: Fusion Research & Development Program
Role: co-PI
Budget: $313,293* (50% of Total $626,586*)

Period: 2022-05-01 – 2026-12-31

[7] Multipurpose Next-Generation Molten Salt Reactor Integrated Human Resource Development Center

Agency: National Research Foundation of Korea
Program: Next-Generation Nuclear Professional Program
Role: sub-I
Budget: $147,742* (4% of Total $4,079,407*)
Period: 2025-05-01 – 2029-12-31

[8] Construction of Nonferrous Metal Material Hub for Next-generation Nuclear Power Plant Based on Data and Machine Learning Technologies

Agency: National Research Foundation of Korea
Program: Nano & Materials Technology Program
Role: sub-I
Budget: $69,914* (4% of Total $1,706,293*)
Period: 2025-04-01 – 2026-12-31

[9] Energy Safety Workforce Development Program

Agency: Korea Institute of Energy Technology Evaluation and Planning
Program: Energy Human-Resource Development Program
Role: sub-I
Budget: $60,020* (41% of Total $147,742*)
Period: 2024-05-01 – 2025-06-30

[10] Global human resource program for SMR and next-generation nuclear energy

Agency: Korea Institute of Energy Technology Evaluation and Planning
Program: Global human resource program
Role: sub-I
Budget: $60,020* (10% of Total $600,204*)
Period: 2024-05-01 – 2025-06-30

[11] Innovative Small Modular Reactor (I-SMR) Technology Program

Agency: i-SMR Development
Program: Innovative Small Modular Reactor (I-SMR) Technology Program (R&D)
Role: sub-I
Budget: $395,739* (2% of Total $20,647,667*)
Period: 2024-04-01 – 2028-12-31

C.2. Industry Funds

[1] Samsung Electronics Research

Agency: Samsung Electronics
Program: Industry-Commissioned Research Funding
Role: PI
Budget: $59,361*
Period: 2026-01-27 – 2026-12-31

[2] Conceptual Design of Next-Generation Isotope Production Technology

Agency: Korea Hydro & Nuclear Power Company
Program: Industry-Commissioned Research Funding
Role: co-PI
Budget: $43,531* (10% of Total $435,313*)
Period: 2025-05-14 – 2027-05-31

[3] Hyundai Motors Research

Agency: Hyundai Motors
Program: Industry-Commissioned Research Funding
Role: PI
Budget: $79,049*
Period: 2023-08-21 – 2025-03-10

[4] Hyundai E&C Research
Agency: Hyundai E&C
Program: Industry-Commissioned Research Funding
Role: PI
Budget: $173,136*
Period: 2023-07-24 – 2026-11-30

[5] Samsung Future Research Foundation
Agency: Samsung Future Research Foundation
Program: Industry-Commissioned Research Funding
Role: co-PI
Budget: $32,978*
Period: 2020-03-01 – 2023-02-28

[6] Samsung Future Research Foundation (2)
Agency: Samsung Future Research Foundation
Program: Industry-Commissioned Research Funding
Role: PI
Budget: $329,003* (49% of Total $666,658*)
Period: 2020-03-01 – 2023-05-31

*Converted into USD assuming the exchange rate of 1,516.15 KRW/USD (as of April 01, 2026).

V. Education

A. Courses Taught

The credit-weighted average teaching evaluation score is 98.0/100 (March 2020 – present). The average for College of Engineering during the same period is 93.3/100.

Semester	Course Title	Enrollment	Eval. Score
Fall 2025	Applied Materials Science and Engineering	31	97
Fall 2025	Electrochemical Corrosion in Nuclear Materials	20	99
Fall 2025	Fundamentals of Molten Salt Corrosion	21	99
Spring 2025	Applied Thermodynamics	37	98
Spring 2025	Hydrogen and Process Heat Generation through Nuclear Power	28	97
Spring 2025	Intro to Nuclear Materials Science	17	99
Fall 2024	Academic Writing for Research	30	100
Fall 2024	Applied Materials Science and Engineering	27	97
Fall 2024	Electrochemical Corrosion in Nuclear Materials	15	95
Spring 2024	Applied Thermodynamics	28	99
Spring 2024	Intro to Nuclear Materials Science	17	95
Fall 2023	Academic Writing for Research	13	100
Fall 2023	Applied Materials Science and Engineering	16	96

Semester	Course Title	Enrollment	Eval. Score
Fall 2023	Decommissioning Radioactive Waste Management	7	99
Fall 2023	Electrochemical Corrosion in Nuclear Materials	11	100
Fall 2023	Spent Nuclear Fuel Engineering	4	100
Spring 2023	Applied Thermodynamics	35	97
Spring 2023	Intro to Nuclear Materials Science	19	100
Fall 2022	Applied Materials Science and Engineering	27	100
Fall 2022	Electrochemical Corrosion in Nuclear Materials	4	100
Fall 2022	Spent Nuclear Fuel Engineering	2	100
Spring 2022	Capstone Design for Nuclear Engineers	16	98
Spring 2022	Intro to Nuclear Materials Science	18	98
Fall 2021	Applied Materials Science and Engineering	23	100
Fall 2021	Electrochemical Corrosion in Nuclear Materials	15	97
Spring 2021	Academic Writing for Research	5	100
Spring 2021	Intro to Nuclear Materials Science	21	96
Fall 2020	Applied Materials Science and Engineering	32	90
Fall 2020	Electrochemical Corrosion in Nuclear Materials	28	99
Spring 2020	Intro to Heat Transfer	37	100
Spring 2020	Probability and Statistics	60	96

Selected Student Comments:

"The best teaching quality I have experienced in the Department of Nuclear Engineering at Hanyang University, with very active responses to questions." — Applied Materials Science and Engineering, Fall 2025

"The lectures following the grand theme of chemical potential were excellent. Most importantly, understanding why the equations exist helped build natural comprehension." — Applied Thermodynamics, Spring 2025

"I gained a lot as a researcher, even though it was not directly related to my research." — Hydrogen and Process Heat Generation through Nuclear Power, Spring 2025

"I highly recommend this course. The teaching quality was so excellent that I could understand everything even without prior courses, and the professor always answered questions thoroughly." — Electrochemical Corrosion in Nuclear Materials, Fall 2023

"The best lecture — thank you. The personalized, communicative teaching style was wonderful." — Spent Nuclear Fuel Engineering, Fall 2023

"The class model where students submit work and collectively revise it together was excellent for building individual skills." — Academic Writing for Research, Fall 2023

"I liked how the emphasis was made on how the different processes are modelled starting from simple principles and what the line of thinking is in the field." — Intro to Nuclear Materials Science, Spring 2023

"Learning LAMMPS and gaining a foundational understanding of molecular dynamics was a great experience." — Capstone Design for Nuclear Engineers, Spring 2022

"The class quality is remarkably high, and the rapid feedback was greatly appreciated." — Applied Materials Science and Engineering, Fall 2021

"Whenever I emailed questions about lectures or assignments, the professor always replied quickly with detailed explanations, which greatly helped my understanding." — Applied Materials Science and Engineering, Fall 2021

B. Student Guidance

B.1. Ph.D. Students

[1] **Minkyung Choi**
2025/09–present
Publications: N/A

[2] **Seongwon Ham**
2023/03–present
Publications: [J1], [J3], [J33]
Awards: [H2], [H6]

[3] **Hyeonwoo Kim**
2022/03–present
Publications: [J5], [J33]

[4] **Ho Lee**
2021/03–present
Publications: [J3], [J30], [J37]
Awards: [H2]

[5] **Dongjun Lee**
2021/03–present
Publications: N/A

[6] **Hyojeon Kim**
2021/03–present
Publications: N/A

[7] **Ho-A Kim**
2021/03–2024/08
Publications: [J1], [J6], [J7], [J15], [J17], [J25]
Awards: [H2]
Employment: Korea Atomic Energy Research Institute (Daejeon, Korea)

[8] **Eunho Choi**
2020/09–present
Publications: [J26], [J28], [J39]

[9] **Youjin Kang**
2020/03–present
Publications: N/A

B.2. Masters Students

[1] **Minho Kim**
2025/03–present
Publications: [J1], [J3]
Awards: [H2]

[2] **Heejin Park**
2025/03–present
Publications: N/A

[3] **Mincheol Kim**
2025/03–present
Publications: [J6], [J7]

[4] **Myungjin Jung**

2025/03–present
Publications: N/A

[5] **Kanghyeon Kim**
2024/03–2026/02
Publications: [J3]

[6] **Sungjun Choi**
2024/03–2026/02
Publications: [J6], [J7], [J17]

[7] **Yoondong Lee**
2022/03–2024/02
Publications: N/A
Employment: Hyundai Engineering & Construction Company (Seoul, Korea)

[8] **Kihoon Ryu**
2021/03–2023/02
Publications: [J26]
Employment: LX International (Seoul, Korea)

[9] **Hasan Çapraz**
2021/03–2023/02
Publications: N/A
Employment: The Turkish Atomic Energy Authority (Ankara, Turkey)

B.3. Mentored Researchers

[1] **Myoungwoo Kim** (Postdoctoral Researcher)
2026/03–present
Publications: N/A

[2] **Suman Hu** (Postdoctoral Researcher)
2025/09–present
Publications: N/A

[3] **Shi-Hyun Seok** (Postdoctoral Researcher)
2025/03–present
Publications: N/A

[4] **Choah Kwon** (Postdoctoral Researcher)
2021/07–2024/01
Publications: [J1], [J5], [J8], [J13], [J14], [J18], [J20], [J21], [J22], [J24], [J27], [J30], [J33]
Awards: [H2]
Employment: LG Energy Solution (Daejeon, Korea)

B.4. Service on Thesis or Dissertation Committees

[1] Hyeonseok Lee, "*Development of a potential model and a correction technique for molecular dynamics simulation of molten salts*," Seoul National University, 12/2025

[2] Seyeon Heo, "*Implementation and Validation of the IMAS Integration of SPECE Code for Electron Cyclotron Emission Diagnostic in KSTAR and ITER*," Hanyang University, 12/2025

[3] Minjeong Kim, "*Fine–Tuning Korean Pre–trained Language Model on Small Domain–Specific Datasets for the Binary Classification of Documents on Radiation Protective Action Guidelines against Radiation in the Natural Environment*," Hanyang University, 12/2025

[4] Sejin Kwon, "*Estimation of Tritium Production in a Lithium Target within the Yongbyon 5 MWe Reactor Using the MCN*," Hanyang University, 12/2025

[5] Jinseok Koh, "*Strategic Design of Nanomaterials via Controlled Defect, Interface, and Alloy Structure Engineering: A Comprehensive Approach to Hydrogen Production, Purification, and Storage*," KAIST, 12/2025

[6] Keonil Cha, "*Development of an LEU+ ATF Storage System with Criticality-Safety Analysis*," Sejong University, 11/2025

[7] Areum Moon, "*Study on the radioactivity of concrete shielding and components during the dismantling of a linear accelerator*," Hanyang University, 06/2025

[8] Jaechang Kim, "*Design and Performance Evaluation of a Spent Nuclear Fuel Measurement System using the Differential Die-Away Method* ," Hanyang University, 05/2025

[9] Do-Hyun Lim, "*Development of Level 2 PSA Methodology for the Site Large Early Release Frequency of NPPs*," Hanyang University, 05/2025

[10] Kyungmin Kim, "*A Study on the Development of In-Situ Characterization Technology for Radioactive Waste Clearance in Nuclear Decommissioning*," Hanyang University, 12/2024

[11] Beomjin Jeong, "*Investigation of Thermal Radiation Shield Effects on Reduction of Heat Loss in a Small Modular Reactor During Normal Operation*," Hanyang University, 12/2024

[12] Geunyoung Byeon, "*An Investigation of Heat Transfer Mechanisms in an Enclosed Metal Containment Vessel for an Integrated Water-Cooled Small Modular Reactor*," Hanyang University, 12/2024

[13] Seungki Shin, "*Fluoride-free synthesis strategy for luminescent InP cores and effective shelling processes via combinational precursor chemistry*," Hanyang University, 12/2024

[14] Younghoon Lee, "*Theoretical Study of Geodesic Acoustic Modes in the Presence of Poloidally Inhomogeneous Sources and Energetic Particles with Finite Orbit Width in Tokamak Plasmas*," Hanyang University, 12/2024

[15] Beom Gwon Son, "*Design of functional separators with lithiophilic interphase modulation to stabilize and improve the performance of Li-metal batteries*," KAIST, 06/2024

[16] Jongmin Bae, "*Tunable Ion Energy Barrier Modulation and Enhanced Reliability Effect through Fluorine Doping for Memristive Neuromorphic Systems*," KAIST, 06/2024

[17] Ki Ryuk Bang, "*Design of Nanochannel Structure in Two-Dimensional Material-Based Membrane for Environmental and Energy Applications*," KAIST, 05/2024

[18] Geon Hyeong Lee, "*A Numerical Investigation of Conjugated Heat-loss Mechanism Depending on Gas Type and Surface Emissivity of a Metal Containment vessel in a Water-cooled Small Modular Reactor During Normal Operation*," Hanyang University, 12/2023

[19] Dong Ju Han, "*Effects of Chemical/Structural Characteristics of Carbon Scaffolds on Magnesium Nanoconfinement and Hydrogen Storage Properties*," KAIST, 06/2022

[20] Sangmin Lee, "*Development of Plastic Scintillator for Dosimeter Application Using DLP 3D Printing Technique*," Hanyang University, 12/2020

[21] Inwon Yeu, "*Anisotropic Control of Surface Structures and Growth of GaAs: from Ab Initio to Thermodynamics*," Seoul National University, 05/2020

VI. Service

A. Professional Contributions

1. Committee Member, The Minerals, Metals & Materials Society (Corrosion and Environmental Effects Committee), 2026.03.18 – 2028.03.17
2. Symposium Co-organizer, The Minerals, Metals & Materials Society 2027 (Materials and Chemistry for Molten Salt Systems), 2026.03.18 – 2027.03.15
3. Symposium Co-organizer, The Minerals, Metals & Materials Society 2027 (Local Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion), 2026.03.18 – 2027.03.15
4. Committee on Industry-Academic Cooperation, Korean Sensors Society, 2026.01.01 – 2026.12.31
5. Councilor, Korean Radioactive Waste Society, 2025.04.01 – 2026.03.31

6. International Cooperation Committee, Korean Ceramic Society, 2025.01.01 – 2026.12.31
7. Committee Member, Korean Society for Radiation Protection, 2023.01.01 – 2025.12.31
8. Local Symposium Organizing Committee, Nano Korea 2019 (TS12), 2018.11.01 – 2019.06.30
9. Local Organizing Committee, NGPT 2018, 2017.09.01 – 2018.05.31
10. Safety Manager, Ju Li Group, MIT, 2013.09.01 – 2014.08.31

B. Public and Community Service

1. Sports Integrity Committee, Seoul Tennis Association, 2026.02.23 – 2028.01.31
2. Presentation, LINCage Festival for Global Leaders Energy ICC, 2024.08.12 – 2024.08.12
3. Presentation, Global Technology Conference 2023, 2023.09.14 – 2023.09.14
4. Monthly Supporter/Donor, Médecins Sans Frontières (Doctors without Borders), 2018.05.01 – present

C. Journal Reviews

Total 94 reviews for 55 journals.

1. *Nature Nanotechnology* (1 review, 08/2019)
2. *Nature Communications* (1 review, 03/2026)
3. *Nano-Micro Letters* (1 review, 06/2025)
4. *Advanced Energy Materials* (1 review, 07/2023)
5. *Nano Energy* (7 reviews, 09/2024, 12/2018, 11/2018, 10/2018, 05/2018, 12/2017, 08/2017)
6. *ACS Nano* (1 review, 08/2025)
7. *Advanced Functional Materials* (1 review, 01/2024)
8. *Chemical Engineering Journal* (2 reviews, 02/2025, 09/2023)
9. *Small (Wiley)* (2 reviews, 03/2025, 12/2024)
10. *Nano Convergence* (2 reviews, 10/2021, 07/2021)
11. *Journal of Materials Chemistry A* (2 reviews, 05/2017, 08/2016)
12. *Applied Energy* (5 reviews, 01/2019, 07/2018, 07/2018, 07/2018, 12/2017)
13. *Energy Conversion and Management* (1 review, 02/2025)
14. *Nano Letters* (1 review, 06/2025)
15. *ACS Applied Materials & Interfaces* (1 review, 07/2024)
16. *Desalination* (1 review, 11/2023)
17. *Materials & Design* (1 review, 11/2024)
18. *Journal of Environmental Chemical Engineering* (2 reviews, 10/2025, 01/2025)
19. *Energy* (1 review, 06/2018)
20. *Inorganic Chemistry Frontiers (RSC)* (1 review, 07/2020)
21. *Journal of Industrial and Engineering Chemistry* (1 review, 11/2024)
22. *Journal of Alloys and Compounds* (3 reviews, 03/2025, 01/2025, 01/2025)
23. *Journal of the European Ceramic Society* (1 review, 06/2022)
24. *Journal of Materials Chemistry C* (1 review, 04/2017)
25. *Journal of the Taiwan Institute of Chemical Engineers* (1 review, 12/2024)
26. *Electrochimica Acta* (1 review, 10/2024)
27. *ACS Applied Energy Materials* (1 review, 07/2023)
28. *Materials Characterization* (1 review, 06/2025)
29. *Extreme Mechanics Letters* (1 review, 07/2019)
30. *Batteries (MDPI)* (1 review, 06/2019)
31. *Communications Engineering (Nature)* (1 review, 06/2025)
32. *Int. J. Precision Engineering and Manufacturing-Green Technology* (3 reviews, 08/2025, 03/2021, 02/2019)
33. *Sensors and Actuators A: Physical* (4 reviews, 06/2018, 07/2017, 05/2017, 01/2017)
34. *Sensors (MDPI)* (4 reviews, 06/2020, 11/2019, 01/2019, 08/2018)

35. *Metals and Materials International* (1 review, 07/2024)
36. *Materials Today Communications* (4 reviews, 04/2025, 02/2025, 02/2025, 12/2024)
37. *Materials (MDPI)* (3 reviews, 04/2019, 03/2019, 12/2018)
38. *Journal of Physics D: Applied Physics* (1 review, 12/2016)
39. *Carbon Footprints* (2 reviews, 10/2024, 10/2023)
40. *Materials Letters* (1 review, 06/2024)
41. *Energies (MDPI)* (3 reviews, 11/2023, 01/2020, 10/2019)
42. *Journal of Nuclear Materials* (3 reviews, 10/2025, 06/2025, 04/2025)
43. *Korean Journal of Chemical Engineering* (2 reviews, 06/2025, 11/2024)
44. *Materials Letters: X* (2 reviews, 11/2024, 11/2024)
45. *Actuators (MDPI)* (1 review, 08/2020)
46. *Journal of Electroceramics* (1 review, 12/2019)
47. *Progress in Nuclear Energy* (2 reviews, 12/2025, 12/2025)
48. *Electrochem (MDPI)* (1 review, 02/2021)
49. *Journal of Electronic Materials* (1 review, 08/2019)
50. *Annals of Nuclear Energy* (1 review, 10/2025)
51. *Nuclear Engineering and Design* (1 review, 01/2025)
52. *Solid-State Electronics* (1 review, 05/2018)
53. *Journal of Nuclear Fuel Cycle and Waste Technology* (2 reviews, 03/2026, 11/2025)
54. *Ceramics International* (1 review, 03/2026)
55. *Engineering (Elsevier)* (1 review, 08/2025)

Last updated: April 2026