

Jin Myung Kim, Ph.D.

Mechanical and Aerospace Engineering
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Education

University of Illinois, Urbana-Champaign (UIUC) <i>Ph.D. in Materials Science and Engineering</i> • Advisor: Prof. SungWoo Nam	Champaign-Urbana Aug 2022
Seoul National University <i>M.S. in Materials Science and Engineering</i> • Advisor: Prof. Shinhoo Kang	Seoul, South Korea Feb 2012
Seoul National University <i>B.S. in Materials Science and Engineering with Honor</i>	Seoul, South Korea Feb 2012

Research and Professional Experiences

University of California, Irvine –Mechanical and Aerospace Engineering <i>Postdoctoral Scholar (Principal Investigator: SungWoo Nam)</i> • Investigate photo-induced van der Waals interactions between two-dimensional materials and a metallic tip in terms of electric bias and local strain distribution • Engineering of heterostrain on vertically stacked 2D heterostructures with research groups in UCI MRSEC.	Irvine, CA Aug 2022–Present
University of California, Irvine –Mechanical and Aerospace Engineering <i>Visiting Student (Advisor: SungWoo Nam)</i> • Collaborate on frictional and surface properties of vertically stacked 2D heterostructures with research groups in UCI.	Irvine, CA Oct 2021–Aug 2022
University of Illinois at Urbana-Champaign – Materials Science and Engineering <i>Graduate Research Assistant (Advisor: SungWoo Nam)</i> • Strain engineering of 2D materials for tunable excitonic behavior and fabrication of actively reconfigurable optical devices for quantum emitters • Dynamic modulation of graphene surface properties via electrical/chemical doping and Fermi-level engineering	Champaign-Urbana, IL Oct 2017 – Aug 2022
National Institute for Materials Science – Advanced Key Technologies Division <i>Dispatch Researcher</i> • Worked as an exchange dispatch researcher at NIMS for international research collaboration program titled KIMS Academy Lab • Develop electrically conductive engineering ceramics while maintaining mechanical and plasma-resistant properties	Tsukuba, Japan Oct-Nov 2013, Oct-Nov 2014
Korea Institute of Materials Science – Engineering Ceramics Group <i>Senior Research Staff</i> • Investigated transparent polycrystalline yttria and magnesium aluminate spinel for armor/window applications, especially considering the homogeneous green compaction and the contamination-free sintering processes • Fabricated sintered reaction-bonded silicon nitride (SRBSN) with high thermal conductivity sufficient for application to heat-dissipating substrates in high-power devices • Collaborated with companies on projects to investigate microstructure optimization in SiAlON ceramics for high wear-resistant bearing applications	Changwon, Korea Mar 2012 – July 2017
Seoul National University – Materials Science and Engineering <i>Graduate Research Assistant (Advisor: Shinhoo Kang)</i> • Synthesized nanoporous carbide-derived carbon from carbonitride solid solution precursors for improved physisorption capacity to uptake hydrogen and application of it to a Kubas binding scaffold • Established the nucleation and growth mechanism of platelet tungsten carbide particles during carbothermal reduction and liquid-phase sintering	Seoul, Korea Mar 2010 – Feb 2012

Awards & Recognitions

Graduate Student Awards (GSA) Finalist – Materials Research Society (MRS)	Apr 2023
Racheff Teaching Fellowship – UIUC Materials Science and Engineering	Aug 2020
Outstanding Poster Award – 4 th International Symposium on New Frontier of Advanced Si-Based Ceramics and Composites	Sept 2016
Poster of Merit Award – PowderMet 2013, MPIF/APMI	June 2013
Best Poster Award – Fall Meeting of Korean Ceramic Society	Apr 2012
Best Undergraduate Poster Award – Materials Science and Engineering, SNU	Dec 2009
Department of Undergraduate Scholarships – Materials Science and Engineering, SNU	2005 - 2009

Publications

1. Greenwood Gus*, **Jin Myung Kim***, Shahriar M. Nahid, Yeageun Lee, SungWoo Nam, and Rosa M. Espinosa-Marzal, "Dynamically tuning friction at the graphene interface using the field effect", *under revision in Nat. Commun.* (*equally contributed)
2. **Jin Myung Kim***, Kwang-Yong Jeong*, Jae-Pil So, Michael Cai Wang, Peter Snapp, Hong-Gyu Park, SungWoo Nam "Strained two-dimensional tungsten diselenide toward straintronics", *under revision in Nat. Commun.* (*equally contributed)
3. Soyeong Kwon, **Jin Myung Kim**, Peiwen J. Ma, Weilin Guan, and SungWoo Nam, "Near-field nano-optical imaging of van der Waals materials", submitted to *Advanced Physics Research*
4. **Jin Myung Kim**, Md Farhadul Haque, Ezekiel Y. Hsieh, Shahriar Muhammad Nahid, Ishrat Zarin, Kwang-Yong Jeong, Jae-Pil So, Hong-Gyu Park, SungWoo Nam "Strain engineering of low-dimensional materials for emerging quantum phenomena and functionalities", *Adv. Mater.*, 2107362, doi.org/10.1002/adma.202107362
5. Jingcheng Ma, **Jin Myung Kim**, Muhammad Jahidul Hoque, SungWoo Nam, David G. Cahill, Nenad Miljkovic "Role of thin film adhesion on capillary peeling", *Nano Lett.*, 21, 9983 (2021)
6. Gus Greenwood, **Jin Myung Kim**, Qianlu Zheng, Shahriar Muhammad Nahid, SungWoo Nam, Rosa M Espinosa-Marzal "Effects of layering and supporting substrate on liquid slip at the single-layer graphene interface", *ACS Nano*, 15, 10095 (2021)
7. Md Farhadul Haque, Peter Snapp, **Jin Myung Kim**, Michael Cai Wang, Hyung Jong Bae, Chullhee Cho, SungWoo Nam "Strongly enhanced electromechanical coupling in atomically thin transition metal dichalcogenides", *Mater. Today*, 47, 69 (2021) (*cover feature*)
8. Chullhee Cho, Pilgyu Kang, Amir Taqieddin, Yuhang Jing, Keong Yong, **Jin Myung Kim**, Md Farhadul Haque, Narayana R Aluru, SungWoo Nam "Strain-resilient electrical functionality in thin-film metal electrodes using two-dimensional interlayers", *Nat. Electron.*, 4, 126 (2021)
9. Jae-Pil So, Kwang-Yong Jeong, Jung Min Lee, Kyoung-Ho Kim, Soon-Jae Lee, Woong Huh, Ha-Reem Kim, Jae-Hyuck Choi, **Jin Myung Kim**, Yoon Seok Kim, Chul-Ho Lee, SungWoo Nam, Hong-Gyu Park "Polarization Control of Deterministic Single-Photon Emitters in Monolayer WSe₂", *Nano Lett.*, 21, 1546 (2021)
10. **Jin Myung Kim***, Chullhee Cho*, Ezekiel Y Hsieh, SungWoo Nam "Heterogeneous deformation of two-dimensional materials for emerging functionalities", *J. Mater. Res.*, 35, 1369 (2020) (*equally contributed)
11. Peter Snapp*, **Jin Myung Kim***, Chullhee Cho*, Juyoung Leem, Md Farhadul Haque, SungWoo Nam "Interaction of 2D materials with liquids: wettability, electrochemical properties, friction, and emerging directions", *NPG Asia Mater.*, 12, 22 (2020) (*equally contributed)
12. Juyoung Leem, Yeageun Lee, Michael Cai Wang, **Jin Myung Kim**, Jihun Mun, Md Farhadul Haque, Sang-Woo Kang, SungWoo Nam "Crack-assisted, localized deformation of van der Waals materials for enhanced strain confinement", *2D Mater.*, 6, 044001 (2019)
13. Anirudh Krishna, **Jin Myung Kim**, Juyoung Leem, Michael Cai Wang, SungWoo Nam, Jaeho Lee "Ultraviolet to Mid-Infrared Emissivity Control by Mechanically Reconfigurable Graphene", *Nano Lett.*, 19, 5086 (2019)
14. Sun Sang Kwon, Jonghyun Choi, Mohammad Heiranian, Yerim Kim, Won Jun Chang, Peter M Knapp, Michael Cai Wang, **Jin Myung Kim**, Narayana R Aluru, Won Il Park, SungWoo Nam "Electrical Double Layer of Supported Atomically Thin Materials", *Nano Lett.*, 19, 4588 (2019)
15. **Jin Myung Kim**, Sin Il Ko, Ha Neul Kim, Jae Woong Ko, Jae Wook Lee, Hai Doo Kim and Young Jo Park "Effects of microstructure and intergranular glassy phases on thermal conductivity of silicon nitride", *Ceram. Int.*, 43, 5441 (2017)
16. Lin Gan, Young Jo Park, Haniel Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee "The effects of the temperature and pressure on ZrO₂-doped transparent yttria ceramics fabricated by a hot-pressing method", *Opt. Mater.*, 71, 109 (2017)
17. **Jin Myung Kim**, Ha Nuel Kim, Young Jo Park, Jae Woong Ko, Jae Wook Lee, Hai Doo Kim "Microstructure and

- optical properties of transparent MgAl₂O₄ prepared by Ca-infiltrated slip-casting and sinter-HIP process”, *J. Eur. Ceram. Soc.*, 36, 2027 (2016)
18. Ha Neul Kim, Jae Woong Ko, **Jin Myung Kim**, Young Jo Park, Jae Wook Lee, Hai Doo Kim, Seung Jun Lee, Seung Su Paek, Il Sung Seo “Enhanced nitridation of silicon compacts by Yb₂O₃ addition”, *Ceram. Int.*, 42, 7072 (2016)
 19. Lin Gan, Young Jo Park, Hanuel Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Mechanical properties of submicrometer-grained transparent yttria ceramics by hot pressing with hot-isostatic pressing”, *Int. J. Appl. Ceram. Technol.*, 13, 678 (2016)
 20. Ha Neul Kim, Young Jo Park, **Jin Myung Kim**, Jae Wook Lee, Jae Woong Ko, Hai Doo Kim, Seung Jun Lee, Seung Su Paek, Il Sung Seo “The catalytic role of additive components for the nitridation of silicon/additive mixture”, *J. Ceram. Soc. Jpn.*, 124, 192 (2016)
 21. Lin Gan, Young Jo Park, Lin-Lin Zhu, Shin Il Go, Hanuel Kim, **Jin Myung Kim**, Jae Woong Ko “Enhancement of the optical transmittance of hot-pressed transparent yttria ceramics by a multi-step sintering process”, *Ceram. Int.*, 42, 13952 (2016)
 22. Lin Gan, Young Jo Park, Hanuel Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Fabrication and microstructure of hot pressed laminated Y₂O₃/Nd:Y₂O₃/Y₂O₃ transparent ceramics”, *J. Eur. Ceram. Soc.*, 36, 911 (2016)
 23. **Jin Myung Kim**, Hanuel Kim, Young Jo Park, Jae Woong Ko, Jae Wook Lee, Hai Doo Kim “Fabrication of transparent MgAl₂O₄ spinel through homogeneous green compaction by microfluidization and slip casting”, *Ceram. Int.*, 41, 13354 (2015)
 24. Lin Gan, Young Jo Park, Hanuel Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Fabrication of submicron-grained IR-transparent Y₂O₃ ceramics from commercial nano-raw powders”, *Ceram. Int.*, 41, 11992 (2015)
 25. Young Jo Park, **Jin Myung Kim**, Jae Wook Lee “In-situ synthesis of multicolor emitting Eu²⁺-doped α/β-SiAlON composite phosphor”, *J. Ceram. Process. Res.*, 16, 1 (2015)
 26. Lin Gan, Young Jo Park, Mi Jung Park, Hanuel Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Facile fabrication of highly transparent yttria ceramics with fine microstructures by a hot-pressing method”, *J. Am. Ceram. Soc.*, 98 2002 (2015)
 27. Lin Gan, Young Jo Park, Hanuel Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Effect of pre-sintering and annealing on the optical transmittance of Zr-doped Y₂O₃ transparent ceramics fabricated by vacuum sintering conjugated with post-hot-isostatic pressing”, *Ceram. Int.*, 41, 9622 (2015)
 28. **Jin Myung Kim**, Mi Ju Kim, Jae Wook Lee, Young Jo Park, “Stabilization of moisture-reactive raw materials for improved synthesis of Ca-α-SiAlON:Eu²⁺ phosphor”, *Solid State Sci.*, 35, 50 (2014)
 29. **Jin Myung Kim**, Shinhoo Kang “WC platelet formation via high-energy ball mill”, *Int. J. Refract. Met. H.*, 47, 108 (2014)
 30. Young Jo Park, Mi Jung Park, **Jin Myung Kim**, Jae Wook Lee, Jae Woong Ko, Hai-Doo Kim “Sintered reaction-bonded silicon nitrides with high thermal conductivity: The effect of the starting Si powder and Si₃N₄ diluents”, *J. Eur. Ceram. Soc.*, 34, 1105 (2014)
 31. Brahma Raju Golla, Jae Woong Ko, **Jin Myung Kim**, Hai-Doo Kim “Effect of particle size and oxygen content of Si on processing, microstructure and thermal conductivity of sintered reaction bonded Si₃N₄”, *J. Alloy. Compd.*, 595, 60 (2014)
 32. Young Jo Park, Jae Kyung Ha, **Jin Myung Kim**, Jae Wook Lee, Jong Soo Kim, Byung Nam Kim “The effect of flux addition to Eu²⁺-doped Ca-α-SiAlON phosphor”, *J. Ceram. Soc. Jpn.*, 121, 498 (2013)
 33. Moonsu Seo, Jinhong Kim, **Jin Myung Kim**, Jisun Han, Shinhoo Kang, Ji Soon Ihm, Dong Ok Kim “Tunable and selective formation of micropores and mesopores in carbide-derived carbon”, *Carbon*, 60, 299 (2013)

Presentations

1. [Invited Talk] **Jin Myung Kim** and SungWoo Nam “Strain-engineered van der Waals Materials for Deformable Electronics”, 19th U.S. National Congress on Theoretical and Applied Mechanics 2022, June 2022, Austin, TX
2. **Jin Myung Kim** and SungWoo Nam “Tailoring exciton transport in strained two-dimensional tungsten diselenide toward straintronics”, MRS Spring 2022, Apr 2022, Hawaii, USA.
3. **Jin Myung Kim** and SungWoo Nam “Strain-induced exciton transport in two-dimensional tungsten diselenide”, UKC 2021, Dec 2021, California, USA.
4. **Jin Myung Kim**, Jaepil So, Mike Cai Wang, Hong-Gyu Park and SungWoo Nam “Heterogeneous exciton engineering of two-dimensional materials on 3D wrinkle architectures”, MRS Spring 2019, Apr 2019, Arizona, USA.
5. **Jin Myung Kim**, Hanuel Kim, Jae Woong Ko and Young Jo Park “Silicon nitride with high thermal conductivity for power-module substrate applications”, *MS&T 2016*, Oct 2016, Utah, USA.
6. **Jin Myung Kim**, Hanuel Kim, Jae Woong Ko and Young Jo Park “Correlation between grain boundary characteristics and thermal conductivity in silicon nitride”, *ISASC 2016*, Sep 2016, Busan, Korea.

7. **Jin Myung Kim**, Hanuel Kim, Young Jo Park, Jae Woong Ko, Jae Wook Lee “Effect of Y_2O_3 - Sc_2O_3 sintering additives on microstructure and thermal conductivity of Si_3N_4 ”, *JK Ceramics* 32, Nov 2015, Nagaoka, Japan.
8. **Jin Myung Kim**, Hanuel Kim, Young Jo Park, Jae Woong Ko, Hai Doo Kim “Fabrication of transparent magnesium aluminate spinel via microfluidization and aqueous slip-casting”, *MS&T 2015*, Oct 2015, Ohio, USA.
9. **Jin Myung Kim**, Mi Ju Kim, Jae Wook Lee, Young Jo Park “Effect of reduction process for controlling oxygen content of $CaAlSiN_3:Eu^{2+}$ phosphor”, *IMID 2014*, Aug 2014, Daegu, Korea.
10. **Jin Myung Kim**, Young Jo Park, Jae Wook Lee, Jae Kyung Ha “Stabilization of the ingredient powders of $Ca-\alpha$ - $SiAlON:Eu^{2+}$ phosphor”, *PACRIM 10*, Jun 2013, San Diego, USA.
11. Shinhoo Kang, **Jin Myung Kim** “On the formation of platelet WC during carbothermal reduction”, *PowderMet 2013*, Jun 2013, Chicago, USA.
12. **Jin Myung Kim**, Ji Woong Kim, Shinhoo Kang “Activation energy of grain growth of $(Ti_{1-x}W_x)C$ -Ni cermets”, *Sintering 2011*, Aug 2011, Jeju, Korea.

Patents

Patents Issued

1. **Jin Myung Kim**, Young Jo Park, Jae Wook Lee “Stabilization of Raw Powders for Manufacturing Alpha Sialon Phosphors, Powder Composition Therefrom And Manufacturing Methods for Alpha Sialon Phosphors using the Same”, US (14/644,097), applied / KR (10-1374076).
2. Young Jo Park, **Jin Myung Kim**, Jae Wook Lee, Jae Kyung Ha “Manufacturing Methods for α - $SiAlON$ Phosphor with Enhanced Photo-luminescence Properties”, KR (10-1534326).
3. Sea Hoon Lee, **Jin Myung Kim**, Lun Pung “A HfC Powder and A Manufacturing Method of The Same” KR (10-1633448).

Patents Filed

1. Young Jo Park, Jae Woong Ko, **Jin Myung Kim**, Jae Wook Lee, Ha Neul Kim, Hai Doo Kim “Manufacturing Method of Sintered Reaction Bonded Silicon Nitride With High Thermal Conductivity”, KR (10-2014-0050614).
2. Young Jo Park, **Jin Myung Kim**, Jae Wook Lee, Jae Woong Ko, Ha Neul Kim, Hai Doo Kim “Yttria Based Conductive Plasma-resistant Member and Methods Thereof” US (14/879,789) / KR (10-2014-0136865).
3. Young Jo Park, Ha Neul Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee, Shin Il Ko, “Manufacturing Method of Sintered Reaction Bonded Silicon Nitride With High Thermal Conductivity”, KR (10-2015-0173561).
4. **Jin Myung Kim**, Young Jo Park, Jae Woong Ko, Ha Nuel Kim, Hai Doo Kim, Jae Wook Lee “Manufacturing of Sintered Silicon Nitride Body With High Thermal Conductivity”, KR (10-2015-0169343).
5. Sea Hoon Lee, Bo Ra Yoon, **Jin Myung Kim** “A SiC Powder, SiC Sintered Body And Manufacturing Method of The Same”, PCT/KR2015/010931.
6. Ha Neul Kim, Jae Woong Ko, **Jin Myung Kim**, Young Jo Park, Jae Wook Lee “Manufacturing Apparatus For Reaction Bonded Silicon Nitride And Methods Therefor”, KR (10-2015-0124330).
7. Young Jo Park, Ha Neul Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Manufacturing Methods of Transparent Yttria With Gradient Composition”, KR (10-2016-0054249).
8. Young Jo Park, Ha Neul Kim, **Jin Myung Kim**, Jae Woong Ko, Jae Wook Lee “Manufacturing Methods of Transparent Yttria With Hot-press”, PCT/KR2016/004240.

Teaching & Mentoring Experiences

MAE295 Nanoscale Fabrication and Characterization – Lab Instructor	Jan 2023 – Mar 2023
<ul style="list-style-type: none"> Serves as lab instructor to design and demonstrate the nanofabrication and characterization processes in a graduate-level course 	
Accelerated Learning and Engineering Research Training Program in Electronic and Cyber Security (ALERT) program – Graduate Mentor	Aug 2021 – July 2022
<ul style="list-style-type: none"> Mentee: H. Feldhaus, M. Pelzer (UIUC) Co-lead mentor for undergraduate ROTC students to investigate strain engineered 2D materials 	
MRSEC Research Experiences for Undergraduates (REU) – Graduate Mentor	Aug 2020 – Dec 2020
<ul style="list-style-type: none"> Mentee: T. Simpson (U Alabama) Mentoring for image analysis of biaxial wrinkle structure of 2D materials 	
MSE401 Thermodynamics of Materials (Teaching Assistant) – UIUC	May 2020 – Aug 2020
<ul style="list-style-type: none"> Served as Racheff Teaching Fellw in UIUC MatSE department Co-lead TA for class logistics, Q&A, grading, co-leading the online classes with class instructor to help students to solve homework 	

- Co-lead TA for laboratory session for nanofabrication and characterization of 2D material based electronic devices.

Journal Reviewer Activities

Journal of Computational Electronics (2020), Frontiers in Sensors (2021), The Journal of Physical Chemistry (2022), Optics Express (2022), Crystal Growth and Design (2022), Sensors and Actuators: A. Physical (2022), Nano Letters (2022), npj 2D Materials and Applications (2022)