

CURRICULUM VITAE

Jinho Byun

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RESEARCH EXPERIENCE

Mar. 2023 – Present Post-doctoral researcher at Dept. of Energy Engineering, KEHNTECH

Aug. 2022 – Jan. 2023 R&D engineer at Wonik IPS

Mar. 2022 - July 2022 Post-doctoral researcher at Dept. of Physics, Pusan National Univ.
Advisor: Prof. Jaekwang Lee

EDUCATION

Sep. 2017 - Feb. 2022 Pusan National University, Ph.D.
Major: Computational materials science
Advisor: Prof. Jaekwang Lee
Thesis: Emergent Phenomena at Polar Oxides and Their Applications

Mar. 2012 - Aug. 2017 Pusan National University, B.S.
Major: Physics

TECHNICAL SKILLS

DFT/MD code: VASP, QuantumEspresso, CP2K, Phonopy, GULP
Programming: Python, C++(Arduino)
Scientific computing environment: Linux server management, Git

RESEARCH PROJECTS

Title: 산화물 계면 양자 현상 해석을 위한 유닛셀 단위 in situ all-field 맵핑
from: Nov. 2017 To: Oct. 2022
Role: Elucidation of novel phenomena at oxide surface using MD and spectroscopy simulation
Related publications: 1, 2, 4

Title: 계면제어를 통한 selector-less 강유전체 터널링 메모리 소자 개발
from: July 2017 To: Dec. 2021
Role: Finding new mechanism for the high-performance ferroelectric tunnel junction
Related publications: 5, 7, 13

PUBLICATIONS

1. **Z. Wang[¶], J. Byun[¶]**, S. Lee, J. Seo, B. Park, J. Kim, H.Y. Jeong, J. Bang, J. Lee, S.H. Oh*
Vacancy driven surface disorder catalyzes anisotropic evaporation of polar ZnO (0001) surface. *Nature Communications*, 13, 5616 (2022)

2. **Y.-I. Kim[¶], M. Jeong[¶], J. Byun[¶]**, S.-H. Yang, W. Choi, W.-S. Jang, J. Jang, K. Lee, Y. Kim, J. Lee, E. Lee, Y.-M. Kim (2021). (¶: equally contributed)
Atomic-scale identification of invisible cation vacancies at an oxide homointerface. *Materials Today Physics*, 16, 100302

3. **J. Jo[¶], J. Byun[¶]**, J. Lee, D. Choe, I. Oh, J. Park, M.-J. Jin, J. Lee*, J.-W. Yoo* (2020).
Emergence of Multispininterface and Antiferromagnetic Molecular Exchange Bias via Molecular Stacking on a Ferromagnetic Film. *Advanced Functional Materials*, 30 (11), 1908499

4. M. Sheen, Y. Ko, D. Kim, J. Kim, **J. Byun**, K. Y. Yeon, D. Kim, J. Jung, J. Choi, R. Kim, J. Yoo, I. Kim, C. Joo, N. Hong, J. Lee, S. H. Jeon, S. H. Oh, J. Lee, N. Ahn, C.Lee* (Accepted).
Highly efficient top-down processed blue InGaN nanoscale light-emitting diodes. *Nature* (collaborated with [SAMSUNG DISPLAY](#))

5. K. Lee, **J. Byun**, K. Park, S. Kang, M.-S. Song, J. Park, J. Lee, S. Chae* (2022).
Giant Tunneling Electroresistance in Epitaxial Ferroelectric Ultrathin Films Directly Integrated on Si. *Applied Materials Today*, 26, 101308

6. K. Kang, **J. Byun**, M. Jeon, G. Jo, Y.K. Baek, J. Lee, H. Jeon (2022).
Effect of sintering time on electronic properties of strontium hexaferrite. *Ceramics International*

7. J. Lee, M. S. Song, W.-S. Jang, **J. Byun**, H. Lee, M. H. Park, J. Lee, Y-M Kim*, S. C. Chae*, T. Choi* (2021)
Modulating the ferroelectricity of hafnium zirconium oxide ultrathin films via interface engineering to control the oxygen vacancy distribution, *Advanced Materials Interfaces*, 9 (7), 2101647

8. Y. Ha, **J. Byun**, J. Lee, S. Lee (2021).
Design Principles for the Enhanced Transparency Range of Correlated Transparent Conductors. *Laser & Photonics Reviews*, 15 (5), 2000444

9. J. Jo[¶], **J. Byun**, I. Oh, J. Park, M.-J. Jin, B.-C. Min, J. Lee*, J.-W. Yoo* (2018).
Molecular tunability of magnetic exchange bias and asymmetrical magnetotransport in metalloporphyrin/Co hybrid bilayers. *ACS Nano*, 13 (1), 894-903

10. S.-J. Kwon, B.-M. Jung, T. Kim, **J. Byun**, J. Lee, S.-B. Lee, U.-H. Choi * (2018).
Influence of Al₂O₃ Nanowires on Ion Transport in Nanocomposite Solid Polymer Electrolytes. *Macromolecules*, 51(24), 10194-10201

11. T.T. Ly, G. Duvjir, T. Min, **J. Byun**, T. Kim, M.M. Saad, N.T.M. Hai, S. Cho, J. Lee*, J. Kim* (2017).

Atomistic study of the alloying behavior of crystalline $\text{SnSe}_{1-x}\text{S}_x$. *Physical Chemistry Chemical Physics*, 19 (32), 21648-21654

12. Y. Ha, **J. Byun**, J. Lee, J. Son, Y. Kim, W.-K. Jung, S. Lee*

Infrared transparent conductors via lattice-orbital-charge coupling. *Nano Letters*, 22 (16), 6573–6579

MANUSCRIPTS IN PREPARATION/SUBMITTED FOR REVIEW _____

13. **J. Byun**, J. Lee* (In preparation).

Giant Nonlinearity and On/Off Ratio in HfO_2 -based Ferroelectric Tunnel Junction. *Advanced Materials Interfaces*

INTERNATIONAL CONFERENCE PRESENTATIONS _____

TALKS

J. Byun, Z. Wang, S. Oh, J. Lee. (2021)

Novel Stabilization Mechanism on Polar Oxide Surface. Talk presented at 2021 *Materials Research Society* Fall Meeting

J. Byun, J. Lee. (2021).

Giant Nonlinear Tunneling Current in HfO_2 -based Anti-Ferroelectric Tunnel Junction. Talk presented at the *Electronic Materials and Applications Conference* 2021.

J. Byun, T. Min, J. Lee. (2020).

Giant Nonlinear Tunneling Current in HfO_2 -based Anti-Ferroelectric Tunnel Junction. Talk presented at the *America Physics Society* March Meeting 2020

J. Byun, T. Min, J. Lee. (2019).

First-principles studies of the effects of oxygen vacancies on the HfO_2 -based ferroelectric tunnel junction. Talk presented at the 2019 *Materials Research Society* Fall Meeting

J. Byun, T. Min, J. Lee. (2019).

First-principles studies of the HfO_2 -based ferroelectric tunnel junction. Talk presented at the 5th *International Conference on Advanced Electromaterials*

J. Byun, T. Min, J. Lee. (2019).

Design and modeling of optimal HfO_2 -based ferroelectric tunneling junction. Talk presented at the *Asia-Pacific PFM* 2019 Conference

J. Byun, T. Min, J. Lee. (2018).

Novel high coercivity $\text{Fe}_{16-x}\text{Al}_x\text{N}_2$ alloy. Talk presented at the *IcAUMS* 2018

J. Byun, T. Min, J. Lee. (2018).

Novel high coercivity $\text{Fe}_{16-x}\text{Al}_x\text{N}_2$ alloy. Talk presented at the *American Physics Society March Meeting 2018*

POSTERS

J. Byun, J. Jo, I. Oh, J. Park, M.-J. Jin, B.-C. Min, J.-W. Y, J. Lee. (2019).

First principles study of magnetic exchange interaction in Metalloporphyrin/Co interface. Poster presented at the 3rd *Workshop on Functional Materials Science*.

J. Byun, T. Min, J. Lee. (2019).

First-principles studies of the effects of oxygen vacancy and effective mass on the HfO_2 -based ferroelectric tunnel junction. Poster presented at the 10th *APCTP WORKSHOP ON MULTIFERROICS*.

J. Byun, T. Min, J. Lee. (2018).

First-principles studies of the effects of oxygen vacancies on the HfO_2 -based ferroelectric tunnel junction. Poster presented at the 12th *Japan-Korea Conference on Ferroelectrics*

HONORS AND AWARDS

2021

Outstanding Poster Award

Awarded by the Korean Physics Society (KPS) for Poster entitled: "Interface engineered TER optimization in HfO_2 -based FTJ"

2021

Excellent Academic Award

Awarded by Pusan National University.

2020

Humantech Paper Award

Awarded by Samsung Electronics for the paper entitled: "Anisotropic Evaporation of ZnO Observed by In-situ Cs-Corrected High Resolution TEM"

2019

Outstanding Poster Award

Awarded by Korea Institute for Advanced Study (KIAS) for Poster entitled: "First-principles study of the HfO_2 -based ferroelectric tunnel junction"

OTHER

2013-2014

Military service

2017

Python study manager for graduate students

2018

KIAS CAC Summer School on Scientific Computing and Machine Learning

2021-2021

The president of the student council

GITHUB

<https://github.com/material-JH>