

# Moon-Ho Jo

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## Director<sup>1</sup> and Professor<sup>2</sup>,

<sup>1</sup>Center for Van der Waals Quantum Solids (Institute for Basic Science, IBS), Pohang University of Science and Technology (POSTECH), 77 Chungam-Ro, Nam-Gu, Pohang, 790-784 Korea

<sup>2</sup>Department of Materials Science and Engineering, Pohang University of Science and Technology (POSTECH), 77 Chungam-Ro, Nam-Gu, Pohang, 790-784 Korea

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## Appointments

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**Director** (2022- ), Center for Van der Waals Quantum Solids, Institute for Basic Science (IBS)

**Mueunjae Chair Professor** (2018-), Pohang University of Science and Technology (POSTECH)

**Associate Director** (2013-2021), Center for Artificial Low-Dimensional Electronic Systems, Institute for Basic Science (IBS)

**Chair, Faculty Senate** (2018-2019), Pohang University of Science and Technology (POSTECH)

**Professor** (2013-), **Associate Professor** (2008-2012), **Assistant Professor** (2004-2008), Department of Materials Science and Engineering, Pohang University of Science and Technology (POSTECH)

**Se-Ah Young Chair Professor** (2011-2018), Pohang University of Science and Technology (POSTECH)

**Associate Professor**, (2012-2013), Department of Materials Science and Engineering, Yonsei University

## Education and Degrees

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**Postdoctoral Research Fellow** (2001 – 2004), Harvard University, Chemistry/Physics

**Ph.D.** (2001), University of Cambridge, Materials Science

**Visiting Scholar** (1997-1998), University of Tokyo, Electrical Engineering

**Master / Bachelor** (1997/1995), Yonsei University, Materials Science and Engineering

## Current Research Interests

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Atomic Heteroepitaxy of Low-Dimensional Materials

Electronic and Photonic Device Physics

## Academic Services, Honors and Awards

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Editorial Advisory Board, *Nano Letters*, American Chemical Society (2023~)

Associate Fellow, The Korea Academy of Science and Technology (2016 - )

LS Academic Award, The Korean Institute of Metals and Materials (2017)

Associate Fellow, The Korea Academy of Science and Technology (2016 - )

Fellow of Cambridge Overseas Society (2000 - )

Cambridge Overseas Trust Award (1998 - 2001)

Japanese Government Scholarship (1997-1998)

Presidential Honorable Thesis Award, Yonsei University (1997)

Seo-Am Academic Foundation Scholarship Award (1996-1997)

## Recent Publications (*Selective*)

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1. "Epitaxial layer-by-layer conversions of transition metal dichalcogenides with tunable band alignments", Sukho Lee,<sup>†</sup> Seok Young Min,<sup>†</sup> Hyunje Cho,<sup>†</sup> Jaeho Choi, Hwanjung Chang, Heewon Park, Jong Yoon Choi, Jun Soo Yoon, Cheolhee Han, and Moon-Ho Jo, Submitted, (2024).

2. "Quantum-grade transition metal dichalcogenide monolayer semiconductor in wafer scales vicinal van der Waals epitaxy", Gunho Moon,<sup>†</sup> Sukho Lee,<sup>†</sup> Hyunje Cho,<sup>†</sup> Heewon Park, Heonsu Ahn, Jong Yoon Choi, Cheolhee Han, Myungchul Oh, Jong-Hoon Kang, and Moon-Ho Jo, **Nature Electronics**, Submitted, (2024).
3. "Ultrafast Floquet engineering of Fermi-polaron resonances in charge-tunable monolayer WSe<sub>2</sub> devices", Hyojin Choi, Jinjae Kim, Jiwon Park, Jekwan Lee, Wonhyeok Heo, Jaehyeon Kwon, Sukho Lee, Ahmed Faisal, Kenji Watanabe, Takashi Taniguchi, Zhipei Sun, Moon-Ho Jo\*, and Hyunyoung Choi\*, **Nature Communications**, In press (2024).
4. "Epitaxially defined Luttinger liquid on a MoS<sub>2</sub> bicrystal", Bingchen Deng, Heonsu Ahn, Jue Wang, Gunho Moon, Chao Lei, Giovanni Scuri, Jiho Sung, Elise Brutschea, Kenji Watanabe, Takashi Taniguchi, Fan Zhang, Moon-Ho Jo<sup>†</sup>, and Hongkun Park<sup>†</sup>, **Physical Review Letters**, In press, (2024).
5. "Integrated 1D epitaxial mirror twin boundaries for ultrascaled 2D MoS<sub>2</sub> field-effect transistors", Heonsu Ahn,<sup>†</sup> Gunho Moon,<sup>†</sup> Hang-gyo Jung, Bingchen Deng, Dong-Hwan Yang, Chang-Soo Lee, Cheolhee Han, Hyunje Cho, Youngki Yeo, Cheol-Joo Kim, Chan-Ho Yang, Si-Young Choi, Hongkun Park, Jongwook Jeon, Jin-Hong Park, and Moon-Ho Jo, **Nature Nanotechnology**, 19, 955 (2024).
6. "Correlation-driven non-equilibrium exciton site transition in a WSe<sub>2</sub>/WS<sub>2</sub> moiré supercell", Jinjae Kim,<sup>†</sup> Jiwon Park,<sup>†</sup> Hyojin Choi, Taeho Kim, Soonyoung Cha, Yewon Lee, Kenji Watanabe, Takashi Taniguchi, Jonghwan Kim, Moon-Ho Jo, and Hyunyoung Choi, **Nature Communications**, 15, 3312, (2024).
7. "Spinful hinge states in the higher-order topological insulators WTe<sub>2</sub>", Jekwan Lee, Jaehyeon Kwon, Eunho Lee, Jiwon Park, Soonyoung Cha, Kenji Watanabe, Takashi Taniguchi, Moon-Ho Jo and Hyunyoung Choi, **Nature Communications**, 14, 1801 (2023).
8. "Non-epitaxial single-crystalline 2D material growth by geometrical confinement", Ki Seok Kim, Doyoon Lee, Celesta Chang, Seunghwan Seo, Yaoqiao Hu, Soonyoung Cha, Hyunseok Kim, Jiho Shin, Ju-Hee Lee, Sangho Lee, Justin Kim, Ki Hyun Kim, Jun Min Suh, Yuan Meng, Bo-In Park, Jung-Hoon Lee, Hyung-Sang Park, Hyun Kum, Moon-Ho Jo, Geun Young Yeom, Kyeongjae Cho, Jin-Hong Park, Sang-Hoon Bae and Jeehwan Kim, **Nature**, 614, 88 (2023).
9. "Gate-tunable quantum pathways of high harmonic generation in graphene", Soonyoung Cha, Minjeong Kim, Youngjae Kim, Shinyoung Choi, Sejong Kang, Hoon Kim, Sangho Yoon, Gunho Moon, Taeho Kim, Ye Won Lee, Gil Young Cho, Moon Jeong Park, Cheol-Joo Kim, B. J. Kim, Jae Dong Lee, Moon-Ho Jo and Jonghwan Kim, **Nature Communications**, 13, 6630 (2022).
10. "Deep-ultraviolet electroluminescence and photocurrent generation in graphene/hBN/graphene heterostructures", Su-Beom Song, Seung-Young Seo, Soonyoung Cha, Kenji Watanabe, Takashi Taniguchi, Moon-Ho Jo, Jonghwan Kim, **Nature Communications**, 12, 7134 (2021).
11. "Heteroepitaxial van der Waals semiconductor superlattices", Gangtae Jin,<sup>†</sup> Chang-Soo Lee,<sup>†</sup> Odongo F. N. Okello, Suk-Ho Lee, Min Yeong Park, Soonyoung Cha, Seung-Young Seo, Gunho Moon, Seok Young Min, Dong Hwan Yang, Cheolhee Han, Hyungju Ahn, Jekwan Lee, Hyunyoung Choi, Jonghwan Kim, Si-Young Choi, and Moon-Ho Jo, **Nature Nanotechnology**, 16, 1092 (2021).
12. "Ultrafast non-excitonic valley Hall effect in MoS<sub>2</sub>/WTe<sub>2</sub> heterobilayers", Jekwan Lee, Wonhyeok Heo, Myungjun Cha, Kenji Watanabe, Takashi Taniguchi, Jehyun Kim, Dohun Kim, Soonyoung Cha, Moon-Ho Jo, and Hyunyoung Choi, **Nature Communications**, 12, 1635 (2021).
13. "Reconfigurable photo-induced doping of two-dimensional van der Waals semiconductors using different photon energy", Seung-Young Seo, Gunho Moon, Odongo Francis Ngome Okello, Min Yeong Park, Cheolhee Han, Soonyoung Cha, Hyunyoung Choi, Han Woong Yeom, Si-Young Choi, Jewook Park, and Moon-Ho Jo, **Nature Electronics**, 4, 38 (2021).
14. "Nearly room temperature ferromagnetism in a magnetic-metal-rich van der Waals metal", Junho Seo, Duck Young Kim, Eun Su An, Kyoo Kim, Gi-Yeop Kim, Soo-Yoon Hwang, Dong Wook Kim, Bo Gyu Jang, Heejung Kim, Gyeongsik Eom, Seung Young Seo, Roland Stania, Matthias Muntwiler, Jinwon Lee, Kenji Watanabe, Takashi Taniguchi, Youn Jung Jo, Jieun Lee, Byung Il Min, Moon Ho Jo, Han Woong Yeom, Si-Young Choi, Ji Hoon Shim, and Jun Sung Kim, **Science Advances**, 6, aay8912 (2020).
15. "Atomically thin three-dimensional van der Waals membrane semiconductors by wafer scale growth", Gangtae Jin, Chang-Soo Lee, Xing Liao, Juho Kim, Zhen Wang, Odongo Francis Ngome Okello, Bumsu Park, Jaehyun Park, Cheolhee Han, Hoseok Heo, Jonghwan Kim, Sang Ho Oh, Si-Young Choi, Hongkun Park and Moon-Ho Jo, **Science Advances**, 5, eaaw3180 (2019).
16. "Writing monolithic integrated circuits on a two-dimensional semiconductor with a scanning light probe", Seung-Young Seo, Jaehyun Park, Jewook Park, Kyung Song, Soonyoung Cha, Sangwan Sim, Si-Young Choi, Han Woong Yeom, Hyunyoung Choi, and Moon-Ho Jo, **Nature Electronics**, 1, 512 (2018).

17. "Generation, transport, and detection of valley-locked spin photocurrent in WSe<sub>2</sub>-graphene-Bi<sub>2</sub>Se<sub>3</sub> heterostructures", Soonyoung Cha, Minji Noh, Je-Hyun Kim, Jangyup Son, Hyemin Bae, Doeon Lee, Hoil Kim, Jekwan Lee, Hoseung Shin, Sangwan Sim, Seunghoon Yang, Chul-Ho Lee, Moon-Ho Jo, Jun Sung Kim, Dohun Kim, and Hyunyong Choi, **Nature Nanotechnology**, 13, 910 (2018).
18. "Ultrafast quantum beats of anisotropic excitons in atomically thin ReS<sub>2</sub>", Sangwan Sim, Doeon Lee, Taeyoung Kim, Soonyoung Cha, Ji Ho Sung, Sungjun Cho, Wooyoung Shim, Moon-Ho Jo\* and Hyunyong Choi\*, **Nature Communications**, 9, 351 (2018). (\*co-Corresponding authors)
19. "Coplanar semiconductor-metal circuitry defined on MoTe<sub>2</sub> few-layer polymorphs via heteroepitaxy", Ji Ho Sung<sup>†</sup>, Hoseok Heo<sup>†</sup>, Saerom Si<sup>†</sup>, Hyeong Rae Noh, Yong Hyeon Kim, Kyung Song, Juho Kim, Chang-Soo Lee, Seung-Young Seo, Hyoung Kug Kim, Han Woong Yeom, Jun Sung Kim, Si-Young Choi, Tae-Hwan Kim, and Moon-Ho Jo, **Nature Nanotechnology**, 12, 1064 (2017).
20. "Selectively tunable optical Stark effect of anisotropic excitons in atomically thin ReS<sub>2</sub>", "Selectively tunable optical Stark effect of anisotropic excitons in atomically thin ReS<sub>2</sub>", Sangwan Sim, Doeon Lee, Minji Noh, Soonyoung Cha, Chan Ho Soh, Ji Ho Sung, Moon-Ho Jo, and Hyunyong Choi, **Nature Communications**, 7, 13569 (2016).
21. "Thermoelectric materials by utilizing two-dimensional materials with negative correlation between electrical and thermal conductivity", Myoung-Jae Lee, Ji-Hoon Ahn, Ji Ho Sung, Hoseok Heo, Seong Gi Jeon, Woo Lee, Jae Yong Song, Ki-Ha Hong, Byeongdae Choi, Sung-Hoon Lee and Moon-Ho Jo, **Nature Communications**, 7, 12011 (2016).
22. "1s intraexcitonic dynamics in monolayer MoS<sub>2</sub> probed by ultrafast mid-infrared spectroscopy", Soonyoung Cha, Ji Ho Sung, Sangwan Sim, Jun Park, Hoseok Heo, Moon-Ho Jo\*, and Hyunyong Choi\* **Nature Communications**, 7, 10768 (2016).
23. "Ultra-high modulation depth exceeding 2,400% in the optically-controlled topological surface plasmons", Sangwan Sim, Houk Jang, Nimesh Koirala, Matthew Brahlek, Jisoo Moon, Ji Ho Sung, Jun Park, Soonyoung Cha, Seongshik Oh, Moon-Ho Jo, Jong-Hyun Ahn, and Hyunyong Choi, **Nature Communications**, 6, 8814 (2015).
24. "Enhancement of the anisotropic photocurrent in ferroelectric oxides by strain gradients", Kanghyun Chu, Byung-Kweon Jang, Ji Ho Sung, Yoon Ah Shin, Eui-Sup Lee, Kyung Song, Jin Hong Lee, Chang-Su Woo, Seung Jin Kim, Si-Young Choi, Tae Yeong Koo, Yong-Hyun Kim, Sang-Ho Oh, Moon-Ho Jo, and Chan-Ho Yang, **Nature Nanotechnology**, 10, 972 (2015).
25. "Interlayer orientation dependent light absorption and emission in monolayer semiconductor stacks", Hoseok Heo<sup>†</sup>, Ji Ho Sung<sup>†</sup>, Soonyoung Cha, Bo-Gyu Jang, Gangtae Jin, Donghun Lee, Ji-Hoon Ahn, Myoung Jae Lee, Ji Hoon Shim, Hyunyong Choi and Moon-Ho Jo, **Nature Communications**, 6, 7372 (2015).
26. "Near-field electrical detection of optical plasmons and single-plasmon sources", Abram L. Falk, Frank H. L. Koppens, Chun Yu, Kibum Kang, Nathalie de Leon Snapp, Alexey V. Akimov, Moon-Ho Jo, Mikhail D. Lukin, and Hongkun Park, **Nature Physics**, 5, 475 (2009).

## Professional Affiliations

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Division Chair (Convergence Materials Science Division), *The Korean Institute of Metals and Materials* (2013, 2017-2019)

Division Chair (Nano-Science and Technology Division), *The Korean Conference on Semiconductors* (2010 - 2013)

Editorial Board: *Journal of Semiconductor Technology and Science* (2009 - ), *Metals and Materials International* (2007 - 2014), *Electronic Materials Letters* (2007 - 2014)

Members: *American Physical Society* (1998 - ), *Materials Research Society* (1995 - ), *American Chemical Society* (2004 - ), *Institute Of Physics* (1998 - ), *Korean Institute of Metals and Materials* (2004 - ), *Korean Physical Society* (2004 - ), *Korean Chemical Society* (2004 - ), *Korean Ceramic Society* (2004 - )

## Collaborators and Other Affiliations

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- **Collaborators:** *Hyunyoung Choi (Seoul Natl Univ.), Jonghwan Kim (POSTECH), Han Woong Yeom (POSTECH), Jun Sung Kim (POSTECH), Taehwan Kim (POSTECH), Dohun Kim (Seoul Natl Univ.), Hongkun Park (Harvard Univ.), Philip Kim (Harvard Univ.), Hee Cheul Choi (POSTECH), Jae Hoon Park (POSTECH), Si Young Choi (POSTECH), Neil D Mathur (Cambridge Univ.), Chan Ho Yang (KAIST), Jiwoong Park (Univ. of Chicago), Sang-Wook Cheong (Rutgers Univ.), Jongkyu Kim (POSTECH)*
- **Graduate Advisor:** *Mark G. Blamire, University of Cambridge*
- **Postdoctoral Advisor:** *Hongkun Park, Harvard University*
- **Doctoral Dissertation Advisees:** *Cheol-Joo Kim (Asso. Prof. of Chem. Eng, POSTECH), Jee-Eun Yang (Tech. Staff of SAIT, Samsung), Kibum Kang (Asso. Prof. of Mater. Sci. KAIST), Cheolho Lee (Prof. of EE, Seoul Nat'l Univ.), Yongjun Hong (Prof. of SKKU) Hyun-Seung Lee (Tech. Staff of Samsung Electronics), Donghun Lee (Ass. Prof. of Chem. Eng., Kookmin Univ.), Won-Mo Lee (Tech. Staff of Samsung Electronics), Inchan Hwang (Tech. Staff of Samsung Electronics), Ji Ho Sung (Postdoc, Harvard Univ.), Hoseok Heo (Tech. Staff of SAIT, Samsung), Juho Kim (Tech. Staff of Samsung Electronics), Seung-Young Seo (Tech. Staff of Samsung Electronics), Chang-Soo Lee (Tech. Staff of Samsung Electronics), Gangtae Jin (Ass. Prof. of EE., Gacheon Univ.)*
- **Master Thesis Advisees:** *Chang-Beom Jin (STX Group), Dong An Kim (POSCO), Yong-Jun Cho (SNU), Ru Ri Lee (SK Innovation), Kyungwook Kim (Samsung Electronics), Hyein Hwang (MPI Hamburg), Saerom Si (UCL), Hocheol Shin (TMAX), Donghwi Kim (SK Hynix)*
- **Postdoctoral Trainees:** *Sangwan Sim (Asst. Prof. of Hanyang University), Ji Hoon Ahn (Assoc. Prof. of Hanyang University), Seung Woo Song (Staff Scientist, KRIS), Myoung Jae Lee (Principal Scientist, DGIST), Geunhee Lee (Staff Scientist, Argonne Natl Lab), Gil-Sung Kim (Research Prof, Chunbuk Natl Univ.), Yun Sung Woo (Dankook Univ), Sung Kyu Kim (Staff Scientist, NCNT), Cheolmin Park (Postdoc, KAIST)*
- **Intern Student Advisees:** *Kyung-Guk Ryu (Kyung Hee University, School of Medicine), Sungki Lee (Intel), Dongwoo Kim (Cornell Univ.), Hae-Yeon Kim (The Catholic University of Korea, School of Medicine), Hyobin Yoo (Asst. Prof. of Physics, Seogang University POSTECH.), Minjee Kang (UIUC), Hanbyeol Jung (SK Hinx), Seung-Ae Guk (Yonsei Univ.), Jiafan Yu (Stanford Univ.- Weimo Co), Zhengrong Shang (Stanford Univ. - Apple Co)*

## Full Publications List

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1. "Epitaxial layer-by-layer conversions of transition metal dichalcogenides with tunable band alignments", Sukho Lee,<sup>†</sup> Seok Young Min,<sup>†</sup> Hyunje Cho,<sup>†</sup> Jaeho Choi, Hwanjung Chang, Heewon Park, Jong Yoon Choi, Jun Soo Yoon, Cheolhee Han, and Moon-Ho Jo, Submitted, (2024).
2. "Quantum-grade transition metal dichalcogenide monolayer semiconductor in wafer scales vicinal van der Waals epitaxy", Gunho Moon,<sup>†</sup> Sukho Lee,<sup>†</sup> Hyunje Cho,<sup>†</sup> Heewon Park, Heonsu Ahn, Jong Yoon Choi, Cheolhee Han, Myungchul Oh, Jong-Hoon Kang, and Moon-Ho Jo, **Nature Electronics**, Submitted, (2024).
3. "Ultrafast Floquet engineering of Fermi-polaron resonances in charge-tunable monolayer WSe<sub>2</sub> devices", Hyojin Choi, Jinjae Kim, Jiwon Park, Jekwan Lee, Wonhyeok Heo, Jaehyeon Kwon, Sukho Lee, Ahmed Faisal, Kenji Watanabe, Takashi Taniguchi, Zhipei Sun, Moon-Ho Jo\*, and Hyunyoung Choi\*, **Nature Communications**, In press (2024).
4. "Ultrafast control over stiffening and softening of coherent interlayer coupling in strongly-correlated WSe<sub>2</sub>/WS<sub>2</sub> heterobilayers", Jinjae Kim, Jeonghyeon Suh, Sukho Lee, Kenji Watanabe, Takashi Taniguchi, Moon-Ho Jo, Hongki Min, and Hyunyoung Choi\*, **Nano Letters**, Submitted, (2024).

5. "Epitaxially defined Luttinger liquid on a MoS<sub>2</sub> bicrystal", Bingchen Deng, Heonsu Ahn, Jue Wang, Gunho Moon, Chao Lei, Giovanni Scuri, Jiho Sung, Elise Brutschea, Kenji Watanabe, Takashi Taniguchi, Fan Zhang, Moon-Ho Jo<sup>†</sup>, and Hongkun Park<sup>†</sup>, **Physical Review Letters**, In press, (2024).
6. "Narrowband electroluminescence from isolated colour centres in hexagonal boron nitride", Gyuna Park, Ivan Zhiguli, Hoyoung Jung, Jake Horder, Karin Yamamura, Yerin Han, Hyunje Cho, Hyeon-Woo Jeong, Kenji Watanabe, Takashi Taniguchi, Myungchul Oh, Gil-Ho Lee, Moon-Ho Jo, Igor Aharonovich\*, Jonghwan Kim\*, **Nano Letters**, ASAP, (2024).
7. "Tailoring interlayer coupling in few-layer MoS<sub>2</sub> with stacking configuration", Jong Hun Kim, Kyung-Hwan Jin, Yeonjoon Jung, Gwan-Hyoung Lee, Moon-Ho Jo, Arthur Baddorf, An-Ping Li, Jewook Park, **ACS Applied Nano Materials**, 7, 17214 (2024).
8. "Integrated 1D epitaxial mirror twin boundaries for ultrascaled 2D MoS<sub>2</sub> field-effect transistors", Heonsu Ahn,<sup>†</sup> Gunho Moon,<sup>†</sup> Hanggyo Jung, Bingchen Deng, Dong-Hwan Yang, Chang-Soo Lee, Cheolhee Han, Hyunje Cho, Youngki Yeo, Cheol-Joo Kim, Chan-Ho Yang, Si-Young Choi, Hongkun Park, Jongwook Jeon, Jin-Hong Park, and Moon-Ho Jo, **Nature Nanotechnology**, 19, 955 (2024).
9. "Correlation-driven non-equilibrium exciton site transition in a WSe<sub>2</sub>/WS<sub>2</sub> moiré supercell", Jinjae Kim,<sup>†</sup> Jiwon Park,<sup>†</sup> Hyojin Choi, Taeho Kim, Soonyoung Cha, Yewon Lee, Kenji Watanabe, Takashi Taniguchi, Jonghwan Kim, Moon-Ho Jo, and Hyunyoung Choi, **Nature Communications**, 15, 3312, (2024).
10. "Observation of ultrafast electrons in pendant-embedded conducting two-dimensional polymers", Yeonsang Lee, Minhyuk Choi, Ina Park, In-Chul Hwang, Sk. Atiur Rahaman, Hee Jun Shin, Pritam Giri, Moon-Ho Jo, Kangkyun Baek, Ilha Hwang, Ji Hoon Shim, Jun Sung Kim and Kimoon Kim, **Chem**, 10, 1160 (2024).
11. "Atomistic probing of defect-engineered 2H-MoTe<sub>2</sub> monolayers", Odongo Okello, Dong-Hwan Yang, Seung-Young Seo, Jewook Park, Gunho Moon, Dongwon Shin, Yu-Seong Chu, Sejung Yang, Teruyasu Mizoguchi, Moon-Ho Jo<sup>†</sup> and Si-Young Choi<sup>†</sup>, **ACS Nano**, 18, 6927 (2024).
12. "Full automation of point defect detection in transition metal dichalcogenides through dual mode deep learning algorithm", Dong-Hwan Yang, Yu-Seong Chu, Odongo Francis Ngome Okello, Seung-Young Seo, Gunho Moon, Kwang Ho Kim, Moon-Ho Jo, Dongwon Shin, Sejung Yang and Si-Young Choi, **Materials Horizons**, 11, 747 (2024).
13. "Dephasing dynamics accessed by high harmonic generation: determination of electron-hole decoherence of Dirac fermions", Youngjae Kim, Min Jeong Kim, Soonyoung Cha, Shinyoung Choi, Cheol-Joo Kim, B. J. Kim, Moon-Ho Jo, Jonghwan Kim<sup>†</sup>, Jae Dong Lee<sup>†</sup>, **Nano Letters**, 24, 1277 (2024).
14. "Spinful hinge states in the higher-order topological insulators WTe<sub>2</sub>", Jekwan Lee, Jaehyeon Kwon, Eunho Lee, Jiwon Park, Soonyoung Cha, Kenji Watanabe, Takashi Taniguchi, Moon-Ho Jo and Hyunyoung Choi, **Nature Communications**, 14, 1801 (2023).
15. "Thermodynamically driven tilt grain boundaries of monolayer crystals using catalytic liquid alloys", Min-Yeong Choi, Chang-Won Choi, Dong-Yeong Kim, Moon-Ho Jo, Yong-Sung Kim, Si-Young Choi, and Cheol-Joo Kim, **Nano Letters**, 23, 4516 (2023).
16. "Non-epitaxial single-crystalline 2D material growth by geometrical confinement", Ki Seok Kim, Doyoon Lee, Celesta Chang, Seunghwan Seo, Yaoqiao Hu, Soonyoung Cha, Hyunseok Kim, Jiho Shin, Ju-Hee Lee, Sangho Lee, Justin Kim, Ki Hyun Kim, Jun Min Suh, Yuan Meng, Bo-In Park, Jung-Hoon Lee, Hyung-Sang Park, Hyun Kum, Moon-Ho Jo, Geun Young Yeom, Kyeongjae Cho, Jin-Hong Park, Sang-Hoon Bae and Jeehwan Kim, **Nature**, 614, 88 (2023).
17. "Atomically thin synapse networks on van der Waals photo-memtransistors", Gunho Moon, Seok Young Min, Cheolhee Han, Suk-Ho Lee, Heonsu Ahn, Seung-Young Seo, Feng Ding, Seyoung Kim and Moon-Ho Jo, **Advanced Materials**, 35, 2203481 (2023).
18. "Gate-tunable quantum pathways of high harmonic generation in graphene", Soonyoung Cha, Minjeong Kim, Youngjae Kim, Shinyoung Choi, Sejong Kang, Hoon Kim, Sangho Yoon, Gunho Moon, Taeho Kim, Ye Won Lee, Gil Young Cho, Moon Jeong Park, Cheol-Joo Kim, B. J. Kim, JaeDong Lee, Moon-Ho Jo and Jonghwan Kim, **Nature Communications**, 13, 6630 (2022).
19. "Photoluminescence path bifurcations by spin flip in two-dimensional CrPS<sub>4</sub>", Suhyeon Kim, Sangho Yoon, Hyobin Ahn, Gangtae Jin, Hyesun Kim, Moon-Ho Jo, Changgu Lee, Jonghwan Kim and Sunmin Ryu, **ACS Nano** 16, 16385 (2022).
20. "Deep-ultraviolet electroluminescence and photocurrent generation in graphene/hBN/graphene heterostructures", Su-Beom Song, Seung-Young Seo, Soonyoung Cha, Kenji Watanabe, Takashi Taniguchi, Moon-Ho Jo, Jonghwan Kim, **Nature Communications**, 12, 7134 (2021).
21. "Heteroepitaxial van der Waals semiconductor superlattices", Gangtae Jin,<sup>†</sup> Chang-Soo Lee,<sup>†</sup> Odongo F. N. Okello, Suk-Ho Lee, Min Yeong Park, Soonyoung Cha, Seung-Young Seo, Gunho Moon, Seok Young Min, Dong Hwan Yang, Cheolhee Han, Hyungju Ahn, Jekwan Lee, Hyunyoung Choi, Jonghwan Kim, Si-Young Choi, and Moon-Ho Jo, **Nature Nanotechnology**, 16, 1092 (2021).

22. (Invited review) "Identification of point defects of atomically thin transition-metal dichalcogenide semiconductors as active dopants", Seung-Young Seo, Dong-Hwan Yang, Odongo F. N. Okello, Soonyoung Cha, Gunho Moon, Min Yeong Park, Si-Young Choi and Moon-Ho Jo, **Nano Letters**, 21, 3341 (2021).
23. "Ultrafast non-excitonic valley Hall effect in MoS<sub>2</sub>/WTe<sub>2</sub> heterobilayers", Jekwan Lee,<sup>†</sup> Wonhyeok Heo,<sup>†</sup> Myungjun Cha, Kenji Watanabe, Takashi Taniguchi, Jehyun Kim, Dohun Kim, Soonyoung Cha, Moon-Ho Jo, and Hyunyoung Choi, **Nature Communications**, 12, 1635 (2021). (<sup>†</sup>Equal contributors)
24. "Electrical control of anisotropic and tightly bound excitons in bilayer phosphorene", Sangho Yoon, Taeho Kim, Seung-Young Seo, Seung-Hyun Shin, Su-Beom Song, Boknam Chae, B. J. Kim, Kenji Watanabe, Takashi Taniguchi, Gil-Ho Lee, Moon-Ho Jo, Diana Y. Qiu, Jonghwan Kim, **Physical Review B**, 103, L041407 (2021).
25. "Light absorption and emission by many-body trions in the type-I van der Waals heterostructures", Hyemin Bae, S. Kim, S. Lee, O. Karni, A. O'Beirne, Sangwan Sim, Wonhyeok Heo, E. Barré, Soonyoung Cha, Moon-Ho Jo, T. F. Heinz<sup>‡</sup>, and Hyunyoung Choi<sup>†</sup>, **ACS Photonics**, 8, 1972, (2021).
26. "Reconfigurable photo-induced doping of two-dimensional van der Waals semiconductors using different photon energy", Seung-Young Seo, Gunho Moon, Odongo Francis Ngome Okello, Min Yeong Park, Cheolhee Han, Soonyoung Cha, Hyunyoung Choi, Han Woong Yeom, Si-Young Choi, Jewook Park, and Moon-Ho Jo, **Nature Electronics**, 4, 38 (2021).
27. "Sub band-gap photoresponse by hot electron injections in Au-nanorod decorated van der Waals semiconductor monolayers", Juho Kim, Gangtae Jin, Min Yeong Park, Soonyoung Cha, Seung-Young Seo, Yoon-Jong Moon and Moon-Ho Jo, **Journal of the Korean Physical Society**, 77, 127 (2020).
28. "Programmed band-gap modulation within van der Waals semiconductor monolayers by metalorganic vapor-phase epitaxy", Chang-Soo Lee,<sup>†</sup> Gangtae Jin,<sup>†</sup> Cheolhee Han, Juho Kim, Seung-Young Seo, Min Yeong Park, Heon Su An, Suk Ho Lee, Soonyoung Cha and Moon-Ho Jo, **Chemistry of Materials**, 32, 5084 (2020). (<sup>†</sup>Equal contributors)
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