

Prof. Sangyeon Pak

- School of Electronic and Electrical Engineering, Hongik University
- Wausan-ro 94, Mapo-gu, Seoul, South Korea (04066)
- Email: spak@hongik.ac.kr / Tel: +82 010-8956-5835



Educations

- | | | | |
|-----------|---|---|----------------|
| 2014-2019 | DPhil. (Ph.D.) | University of Oxford (Engineering Science/Electrical Engineering Div.) | Oxford, UK |
| | <ul style="list-style-type: none">Supervisors: Prof. Stephen M. Morris & Prof. SeungNam ChaThesis: "Semiconducting Two-dimensional Nanomaterials for Optoelectronic Devices" | | |
| 2010-2014 | B.S. | University of Wisconsin-Madison (Electrical Engineering) | Wisconsin, USA |
| | <ul style="list-style-type: none">Graduated with Distinction | | |

Experiences (Academic careers)

- | | | |
|-------------------|---|----------------|
| 2022.03 – present | Hongik University (Dept. of Electronic & Electrical Engineering) | Seoul, Korea |
| | <ul style="list-style-type: none">Assistant ProfessorAdvanced Nano Semiconductor Devices Laboratory | |
| 2019.03 – 2022.03 | Sungkyunkwan University (Dept. of Physics/Institute of Basic Science) | Suwon, Korea |
| | <ul style="list-style-type: none">Postdoctoral Research Associate (PI: Prof. SeungNam Cha)Mandatory Military Service (2019.03 – 2022.03)Nanomaterials-based semiconductor devices (TFTs, memory, photosensors, LEDs)Flexible, wearable, and self-powered devicesFlexible Electromagnetic interference (EMI) shielding based on 2D materialsHydrogen evolution reaction based on two-dimensional materials | |
| 2014.10 – 2019.03 | University of Oxford (Department of Engineering Science) | Oxford, UK |
| | <ul style="list-style-type: none">Postgraduate Research AssistantNanomaterials-based TFTs and photosensorsQuantum Dot-based optoelectronics2D material synthesisSolar cells / Energy harvesting / Supercapacitors | |
| 2012.08 – 2014.05 | University of Wisconsin-Madison (Department of ECE) | Wisconsin, USA |
| | <ul style="list-style-type: none">Undergraduate Research Assistant (Plasma Processing and Technology Lab) | |



<Journal Covers>

2024

- 1) W. Shin, J. Byeon, R.-H. Koo, J. Lim, J. H. Kang, A.-R. Jang, J.-H. Lee, J.-J. Kim, S. Cha, * **S. Pak**, * S.-T. Lee, * "Towards Ideal Low-Frequency Noise in Monolayer CVD MoS₂ FETs: Influence of van der Waals Junctions and Sulfur Vacancy Management", *Advanced Science*, 2024, Accepted.
- 2) J. Lim, T. Kim, H. Park, J. Eom, M. Jung, J. Byeon, Y. Lim, **S. Pak**, * S. Cha, * "Surface Wettability-Mediated Enhancement of Hydrogen Evolution Reaction Performance in Electron Doped MoS₂ Monolayer", *ACS Applied Energy Materials*, 2024, 7, 7, 2938-2945.
- 3) J. Kim, S. M. Wi, S. Son, H. Y. Lim, Y. Park, A.-R. Jang, J. B. Park, Y. Cho, Y.-C. Song, * **S. Pak**, * Y.-W. Lee, * "Rationally Engineered Interdigitated Electrodes with Heteroatom Doped Porous Graphene and Improved Surface Wettability for Flexible Micro-Supercapacitors", *Journal of Energy Storage*, 2024, 86, 111272.
- 4) J. Byeon, J. Eom, T. Kim, J. Lim, M. Jung, Y. Lim, H. Park, J. Hong, **S. Pak**, * S. Cha, * "Achieving adsorbate-free monolayered MoS₂ field effect transistors by controlled surface gas treatment", *ACS Applied Electronic Materials*, 2024, 6, 3, 1763-1769.
- 5) S. Y. Woo, **S. Pak**, S. Lee, * "Deep Spiking Neural Networks with Integrate and Fire Neuron Using Steep Switching Device", *Solid-State Electronics*, 2024, 214, 108860.
- 6) G. Kim, D. W. Jeong, S. Lee, G. Lee, K. Y. Ma, H. Hwang, S. Jang, J. Hong, **S. Pak**, S. Cha, Y. -W. Lee, H. S. Shin*, A. -R. Jang, * J. -O. Lee, * "Unusual Raman enhancement effect from two-dimensional copper sulfide", *Small*, 2024, 20, 9, 2306819.
- 7) **S. Pak**, * A.-R. Jang, * Y. -W. Lee, * "Recent progress in electric-field enhanced 3D graphene electrodes using laser scribing for in-plane microsupercapacitors ", *ChemElectroChem*, 2024, 11, 6, e202300594.
- 8) S. M. Wi, J. Kim, S. Son, H. Lim, Y. Park, A.-R. Jang, J. B. Park, Y.-C. Song, * **S. Pak**, * Y.-W. Lee, * "Controlling surface oxygen vacancies in 3D networked MnO₂ based nanocomposites for high performance flexible in-plane micro-supercapacitors", *Applied Surface Science*, 2024, 648, 159060.

2023

- 9) C. Hong, S. Oh, V. K. Dat, **S. Pak**, S. Cha, K.-H. Ko, G.-M. Choi, T. Low*, S.-H. Oh*, and J.-H. Kim* "Engineering electrode interfaces for telecom-band photodetection in MoS₂/Au heterostructures via sub-band light absorption", **Light: Science & Application**, 2023, 12, 280.
- 10) **S. Pak**,* Jung Inn Sohn*, "2D Nanostructures for Optoelectronic and Green Energy Devices", **Nanomaterials** 2023, 13, 6, 1070. (Editorial)
- 11) B. Hou,* F. C. Mocanu,* Y. Cho, J. Lim, J. Feng, J. Zhang, J. Hong, **S. Pak**, J. B. Park, Y. -W. Lee, J. Lee, B. -S. Kim, S. M. Morris, J. I. Sohn,* S. Cha,* J. M. Kim, "Nanofaceting Enabled Local Structural Motifs Evolution in Colloidal Quantum Dot Semiconductor Nanocrystals", **Nano Letters** 2023, 23, 6, 2277-2286.
- 12) **S. Pak**, S. Kim, J. Lim, T. Kim, K. -H. Park,* S. Cha,* "Direct CVD synthesis of MoS₂ monolayers on glass using carbothermal reduction", **Journal of Physical Chemistry C** 2023, 127, 9, 4689-4695.
- 13) S. Jo, **S. Pak**, Y. -W. Lee, S. Cha, J. Hong,* J. I. Sohn,* "Enhancing the Electrochemical Energy-Storage Performance of Bismuth Ferrite Electrodes via Simply Induced Anion Vacancies". **International Journal of Energy Research** 2023, 2023, 249667.
- 14) T. Kim, J. Lim, J. Byeon, Y. Cho, W. Kim, J. Hong, B. -S. Kim, J. Hong,* **S. Pak**,* S. Cha*, "Electronic Modulation of Semi-metallic Electrode for 2D van der Waals Devices" **Small Structures** 2023, 4,5, 2200274.
- 15) J. Kim, S. M. Wi, J. -G. Ahn, S. Son, H. Lim, Y. Park, H. J. Eun, J. B. Park, H. Lim, **S. Pak**,* A. -R. Jang,* Y. -W. Lee,* "Engineering geometric electrodes for electric field-enhanced high performance flexible in-plane micro-supercapacitors", **Energy & Environmental Materials**, 2023, e12581.
- 16) **S. Pak**, J. Son, T. Kim, J. Lim, J. Hwang, J. Hong, Y. Lim, C. -J. Heo, K. -B. Park, Y. W. Jin, K. -H. Park, Y. Cho,* S. Cha,* "Facile one-pot iodine gas phase doping on 2D MoS₂/CuS FET at room temperature" **Nanotechnology** 2023, 34, 015702.

2022

- 17) J. Lim, T. Kim, J. Byeon, K. -H. Park, J. Hong, **S. Pak**,* S. Cha,* "Energy Level Modulation of MoS₂ Monoalyers by Halide Doping for Enhanced Hydrogen Evolution Reaction, Journal of Materials Chemistry A, 2022, 10, 43, 23274-23281.
- 18) **S. Pak**,* "Controlled p-type doping of MoS₂ monolayer by copper chloride", **Nanomaterials**, 2022, 12, 17, 2893.
- 19) S. Jung, J. Lee, J. Park, **S. Pak**, J. Lim, S. Cha, and B. Kim,* "Shift of Switching Threshold in Low-Dimensional Semiconductor-Based Complementary Inverters via Inkjet Printing", **Nanotechnology**, 2022, 33 (30), 305203.
- 20) K. H. Shin, M. -K. Seo, **S. Pak**, A. -R. Jang,* J. I. Sohn,* "Observation of Strong Interlayer Couplings in WS₂/MoS₂ Heterostructures via Low-frequency Raman Spectroscopy", **Nanomaterials**, 2022, 12 (9), 1393.
- 21) T. Kim,* **S. Pak**,* J. Lim, J. S. Hwang, K.-H. Park, B.-S. Kim,* S. Cha,* "Electromagnetic interference Shielding with 2D Copper Sulfide", **ACS Applied Materials & Interfaces**, 2022, 14 (11), 13499-13506.

2021

- 22) Y. Cho,* B. Hou, P. Giraud, **S. Pak**, S. Cha,* "Ferroelectric Field Effect Induced Charge Carrier Transport Modulation at Quantum Dot Solar Cell Heterojunction Interface", **ACS Applied Energy Materials**, 2021, 11 (4), 12056-12062.
- 23) **S. Pak**,* S. Jang,* T. Kim, J. Lim, J. S. Hwang, Y. Cho, H. Chang, A. -R. Jang, K. -H. Park, J. Hong,* S. Cha,* "Electrode-induced self-healed monolayer MoS₂ for high performance transistors and phototransistors", **Advanced Materials**, 2021, 33 (41), 2102091. (Frontispiece)
- 24) Y. Cho,*[†] **S. Pak**,[†] B. Li, B. Hou, S. Cha,* "Enhanced Direct White Emission Efficiency in Quantum Dot Light Emitting Diodes via Embedded Ferroelastic Islands Structure", **Advanced Functional Materials**, 2021, 31 (41), 2104239.
- 25) Y. Cho,*[†] J. Lim,*[†] M. Li, **S. Pak**, Z.-K. Wang, Y. -G. Yang, A. Abate, Z. Li, H. J. Snaith, B. Hou,* S. Cha,* "Balanced Charge Carrier Transport Mediated by Quantum Dot Film Post-Organization for Light-Emitting Diodes Applications", **ACS Applied**

Materials & Interfaces, 2021, 13 (22), 26170-26179.

- 26) J. Hong,[†] B. -S. Kim,[†] B. Hou,[†] **S. Pak**, T. Kim, A. -R. Jang, Y. Cho, S. Lee, G. -H. An, J. E. Jang, S. M. Morris, J. I. Sohn, S. Cha,* "Room Temperature Wafer-Scale Synthesis of Highly Transparent, Conductive CuS Nanosheet Films via a Simple Sulfur Adsorption-Corrosion Method", **ACS Applied Materials & Interfaces**, 2021, 13, 3, 4244-4252.
- 27) **S. Pak**,[†] J. Lim,[†] J. Hong,* S. Cha,* "Enhanced Hydrogen Evolution Reaction in Surface Functionalized MoS₂ monolayers", **Catalysts**, 2021, 11, 70.

2020

- 28) S. Jung,[†] **S. Pak**,[†] S. Lee,* S. Reimers, S. Mukherjee, P. Dudin, T. K. Kim, M. Cattelan, N. Fox, S. S. Dhesi, C. Cacho,* S. Cha,* "Momentum mediated band interaction between chemically transferred, CVD-grown MoS₂ monolayers and Au metal", **Applied Surface Science**, 2020, 532, 147390.
- 29) **S. Pak**, J. Lee, A. -R. Jang, S. Kim, K. -H. Park, J. I. Sohn,* S. Cha,* "Strain-Engineering of Contact Energy Barriers and Photoresponse Behaviors in Monolayer MoS₂ Flexible Devices", **Advanced Functional Materials**, 2020, 30 (43), 2002023.
- 30) J. Hong,[†] B. -S. Kim,[†] B. Hou, Y. Cho, S. Lee, **S. Pak**, S. M. Morris, J. I. Sohn, S. Cha,* "Plasmonic Effects of Dual-Metal Nanoparticle Layers for High-Performance Quantum Dot Solar Cells", **Plasmonics**, 2020, 15, 1007-1013.
- 31) Y. Cho,[†] **S. Pak**,[†] Y. -G. Lee, J. S. Hwang, P. Giraud, G. -H. An,* S. Cha,* "Hybrid smart fiber with spontaneous self-charging mechanism for sustainable wearable electronics", **Advanced Functional Materials**, 2020, 30, 1908479 (**Front Cover**).
- 32) G. -H. An,[†] J. Hong,[†] **S. Pak**, Y. Cho, S. Lee, B. Hou, S. Cha,* "2D metal Zn Nanostructure Electrodes for High-Performance Zn Ion Supercapacitors", **Advanced Energy Materials**, 2020, 21, 1902981. (**Front Cover**)

2019

- 33) J. Hong,[†] J. Lee,[†] Y. -W. Lee,[†] W. B. Park, D. Ahn, J. B. Park, **S. Pak**, J. Baik, S. M. Morris, S. Cha,* K. -S. Sohn,* J. I. Sohn,* J. M. Kim, "Electrochemically Active Binary Anion Compounds with Tailored Oxygen Vacancy for Ultrahigh Capacitive Energy Storage", **Journal of Power Source** 2019, 444, 227301.
- 34) J. Lee,[†] **S. Pak**,[†] Y. -W. Lee, Y. Park, A. -R. Jang, J. Hong, Y. Cho, B. Hou, S. Lee, H. Y. Jeong, H. S. Shin, S. M. Morris, S. Cha, J. I. Sohn, J. M. Kim, "Direct epitaxial synthesis of selective two-dimensional lateral heterostructures", **ACS Nano** 2019, 13, 13047-13055.
- 35) Y. Cho, **S. Pak**, G. -H. An, B. Hou, S. Cha, "Quantum Dots for Hybrid Energy Harvesting: From Integration to Piezo-phototronics", **Israel Journal of Chemistry**, 2019, 59, 747-761.
- 36) **S. Pak**, "Semiconducting two-dimensional nanomaterials for optoelectronic devices", **University of Oxford**, 2019. (Thesis)
- 37) B. Kim,*[†] **S. Pak**,[†] A. -R. Jang, H. W. Choi, J. Lee, Y. Choi, Y. T. Chun, S. Cha, J. I. Sohn,* "Complementary Inverters Based on Low-Dimensional Semiconductors Prepared by Scalable Methods", **2D Materials** 2019, 6 (2), 025017.
- 38) E. M. Alexeev, D. A. Ruiz-Tijerina, M. Danovich, M. J. Hamer, D. J. Terry, P. K. Nayak, S. Ahn, **S. Pak**, J. Lee, J. I. Sohn, M. R. Molas, M. Koperski, K. Watanabe, T. Taniguchi, K. S. Novoselov, R. V. Gorbachev, H. S. Shin, V. I. Fal'ko, A. I. Tartakovskii, "Resonantly hybridized excitons in moire superlattices in van der Waals heterostructures", **Nature** 2019, 567, 81-86.
- 39) **S. Pak**,[†] A. -R. Jang,[†] J. Lee, J. Hong, P. Giraud, S. Lee, Y. Cho, G.-H. An, Y. -W. Lee, H. S. Shin, S. M. Morris, S. Cha*, J. I. Sohn*, J. M. Kim, "Surface Functionalization-induced Photoresponse Characteristics of Monolayer MoS₂ for Fast Flexible Photodetectors", **Nanoscale** 2019, 11, 4726-4734.
- 40) J. Hong, B. -S. Kim, S. -M. Yang, A. -R. Jang, Y. -W. Lee, **S. Pak**, S. Lee, Y. Cho, G. Ahn, D. -W. Kang, H. S. Shin, J. -P. Hong, S. M. Morris, S. Cha,* J. I. Sohn,* J. M. Kim, "Chalcogenide Solution-Mediated Activation Protocol for Scalable and Ultrafast Synthesis of Single-Crystalline 1-D Copper Sulfide for Supercapacitor", **Journal of Materials Chemistry A** 2019, 7, 2529-2535.

2018

- 41) **S. Pak**,[†] Y. Cho,[†] J. Hong, J. Lee, S. Lee, B. Hou, G. -H. An, Y. -W. Lee, J. E. Jang, H. Im, S. M. Morris, J. I. Sohn,* S. Cha,* J. M. Kim, "Consecutive Junction-Induced Efficient Charge Separation Mechanisms for High-Performance MoS₂/Quantum Dot Phototransistors", *ACS Applied Materials & Interfaces* 2018, 10, 38264-38271. (**Front Cover**)
- 42) Y. -W. Lee,[†] J. Hong,[†] G. -H. An, **S. Pak**, J. Lee, Y. Cho, S. Lee, S. Cha,* J. I. Sohn,* J. M. Kim, "Synergetic Effects of Engineered Spinel Hetero-Metallic Cobaltites on Electrochemical Pseudo-Capacitive Behaviors", *Journal of Material Chemistry A* 2018, 6, 15033-15039.
- 43) Y. Cho,[†] S. Lee,[†] J. Hong, **S. Pak**, B. Hou, Y. -W. Lee, J. E. Jang, H. Im, J. I. Sohn,* S. Cha,* J. M. Kim, "Sustainable hybrid energy harvester based on air stable quantum dot solar cells and triboelectric generator", *Journal of Material Chemistry A* 2018, 6, 12440-12446.
- 44) A. -R. Jang, Y. -W. Lee, S. -S. Lee, J. Hong, S.-H. Beak, **S. Pak**, J. Lee, H. S. Shin, D. Ahn, W. -K. Hong, S. Cha, J. I. Sohn,* and I. -K. Park*, "Electrochemical and electrocatalytic reaction characteristics of boron-incorporated graphene via a simple spin-on dopant process", *Journal of Material Chemistry A* 2018, 6, 7351-7356. (**Front Cover**)
- 45) Y. Cho, B. Hou, J. Lim, S. Lee, **S. Pak**, J. Hong, P. Giraud, A. -R. Jang, Y. -W. Lee, J. Lee, J. E. Jang, H. J. Snaith, S. M. Morris, J. I. Sohn,* S. Cha,* J. M. Kim, "Balancing Charge Carrier Transport in a Quantum Dot P-N Junction toward Hysteresis-Free High Performance Solar Cells", *ACS Energy Letters* 2018, 3, 1036-1043.
- 46) P. Giraud, B. Hou, **S. Pak**, J. I. Sohn, S. M. Morris, S. Cha, J. M. Kim, "Field effect transistors and phototransistors based upon p-type solution-processed PbS nanowires", *Nanotechnology* 2018, 29, 075202.
- 47) Y. Cho, P. Giraud, B. Hou, Y. -W. Lee, J. Hong, S. Lee, **S. Pak**, J. Lee, J. E. Jang, S. M. Morris, J. I. Sohn*, S. Cha*, and J. M. Kim, "Charge Transport Modulation of a Flexible Quantum Dot Solar Cell using a Piezoelectric Effect", *Advanced Energy Materials* 2018, 8, 1700809.

2017

- 48) **S. Pak**, J. Lee, Y. -W. Lee, A. -R. Jang, S. Ahn, K. Y. Ma, Y. Cho, J. Hong, S. Lee, H. Y. Jeong, H. Im, H. S. Shin, S. M. Morris, S. Cha*, J. I. Sohn*, J. M. Kim, "Strain-mediated interlayer coupling effects on the excitonic behaviors in an epitaxially-grown MoS₂/WS₂ van der Waals heterobilayer", *Nano Letters* 2017, 17, 5634-5640.
- 49) E. M. Alexeev, A. Catanzaro, O. V. Skrypka, P. K. Nayak, S. Ahn, **S. Pak**, J. Lee, J. I. Sohn, K. S. Novoselov, H. S. Shin, A. I. Tartakovskii,* "Imaging of Interlayer Coupling in van der Waals Heterostructures Using a Bright-Field Optical Microscope", *Nano Letters* 2017, 17, 5342-5349.
- 50) J. Lee, **S. Pak**, P. Giraud, Y. -W. Lee, Y. Cho, J. Hong, A. -R. Jang, H. -S. Chung, H. Y. Jeong, H. S. Shin, L. G. Occhipinti, S. M. Morris, S. Cha*, J. I. Sohn*, J. M. Kim, "Thermodynamically Stable Synthesis of Large-Scale and Highly-Crystalline Transition Metal Dichalcogenide Monolayers and Their Unipolar n-n Heterojunction Devices", *Advanced Materials* 2017, 29, 1702206. (**Front Cover**)
- 51) J. Hong,[†] Y. -W. Lee,[†] D. Ahn, **S. Pak**, J. Lee, A. -R. Jang, S. Lee, B. Hou, Y. Cho, S. M. Morris, H. S. Shin*, S. Cha, J. I. Sohn*, J. M. Kim, "Highly Stable 3D Porous Heterostructures with Hierarchically-Coordinated Octahedral Transition Metals for Enhanced Performance Supercapacitors", *Nano Energy* 2017, 39, 337-345.
- 52) Y. -W. Lee, B. -S. Kim, J. Hong, H. Choi, H. -S. Jang, B. Hou, **S. Pak**, J. Lee, S. Lee, S. M. Morris, D. Whang, J. Hong, H. S. Shin, S. Cha*, J. I. Sohn*, J. M. Kim, "Hierarchically Assembled Tubular Shell-Core-Shell Heterostructure of Hybrid Transition Metal Chalcogenides for High-Performance Supercapacitors with Ultrahigh Cyclability", *Nano Energy* 2017, 37, 15-23.
- 53) J. Lee, **S. Pak**, Y. -W. Lee, J. Hong, P. Giraud, H. S. Shin, S. M. Morris, J. I. Sohn*, S. Cha*, J. M. Kim, "Monolayer Optical Memory Cells based on Artificial Trap-Mediated Charge Storage and Release", *Nature Communications* 2017, 8, 14734.

2016

- 54) J. Hong, Y. -W. Lee, B. Hou, W. Ko, J. Lee, **S. Pak**, J. Hong, S. M. Morris, S. Cha*, J. I. Sohn*, J. M. Kim, "Solubility-Dependent NiMoO₄ Nanoarchitectures: Direct Correlation between Rationally Designed Structure and Electrochemical Pseudo-Kinetics", **ACS Applied Materials & Interfaces** 2016, 8 (51), 35227-35234.
- 55) J. Hong, B. Hou, J. Lim, **S. Pak**, B. -S. Kim, Y. Cho, J. Lee, Y. -W. Lee, P. Giraud, S. Lee, J. B. Park, S. M. Morris, H. J. Snaith, J. I. Sohn*, S. Cha*, J. M. Kim, "Enhanced Charge Carrier Transport Properties in Colloidal Quantum Dots Solar Cells via Organic and Inorganic Hybrid Surface Passivation", **Journal of Material Chemistry A** 2016, 4 (48), 18769-18775. (**Back Cover**)
- 56) Y. Cho, D. Ahn, J. B. Park, **S. Pak**, S. Lee, B. O. Jun, J. Hong, S. Y. Lee, J. E. Jang, J. Hong, S. M. Morris, J. I. Sohn*, S. Cha*, and J. M. Kim, "Enhanced ferroelectric property of P(VDF-TrFE-CTFE) film using room temperature crystallisation for high performance ferroelectric device applications", **Advanced Electronic Materials** 2016, 2, 1600225 (**Front Cover**).
- 57) Y. -W. Lee,[†] G. -H. An,[†] B. -S. Kim, J. Hong, **S. Pak**, E. -H. Lee, Y. Cho, J. Lee, P. Giraud, S. Cha, H.-J. Ahn,* J. I. Sohn,* J. M. Kim, "Synergistic Effects of a Multi-Functional Graphene Based Interlayer on Electrochemical Behavior and Structural Stability", **ACS Applied Materials & Interfaces** 2016, 8 (27), 17651-17658.
- 58) B. -S. Kim, D. C. J. Neo, B. Hou, J. B. Park, Y. Cho, N. Zhang, J. Hong, **S. Pak**, S. Lee, J. I. Sohn, H. E. Assender, A. R. Watt*, S. Cha*, J. M. Kim, "High Performance PbS Quantum Dot/Graphene Hybrid Solar Cell with Efficient Charge Extraction", **ACS Applied Materials & Interfaces** 2016, 8, 13902 – 13908.
- 59) Y. -W. Lee,[†] B. -S. Kim,[†] J. Hong, J. Lee, **S. Pak**, H. -S. Jang, D. Whang, S. N. Cha,* J. I. Sohn,* J. M. Kim, "A Pseudo-Capacitive Chalcogenide-based Electrode with Dense 1-Dimensional Nanoarrays for Enhanced Energy Density in Asymmetric Supercapacitors", **Journal of Material Chemistry A** 2016, 4 (26), 10084-10090. (**Front Cover & 2016 Hot Paper**)

Patents

- 1) K.-W. Park, J. I. Sohn, J. Lee, **S. Pak**, Y. -W. Lee, D. Kwak, "Synthesis method for Chemical vapor deposition of large-area transition metal dichalcogenide monolayer via controlling the vaporizing concentration of precursors" 10-2017-0157878, Registered.
- 2) G. -H. An, S. Cha, **S. Pak**, Y. Cho, "Spontaneous self-charged hybrid energy harvesting and storage device and the manufacturing method thereof", 10-2020-0057172, Pending
- 3) S. Cha, **S. Pak**, B. -S. Kim, J. Hong, "Transparent Conductive Material and Method For Manufacturing the Same", 10-2020-0032975, Pending.
- 4) B.-S. Kim, T. Kim, **S. Pak**, S. Cha, "Electromagnetic Shielding Film and Method of Fabrication the Same", 10-2020-012079, Pending.

Paper Presentation in Conferences

IEEE Nano 2023 (Jeju, Korea) Invited Speaker

(Oral) Sangyeon Pak, "Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

Korea Physics Society Fall Meeting 2023 (Changwon, Korea) Invited Speaker

(Oral) Sangyeon Pak, "Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

Advances in Functional Materials (AFM) 2023 (Fukuoka, Japan) Invited Speaker, Session Chair

(Oral) Sangyeon Pak, "New Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

International Symposium on the Physics and Semiconductors and Applications (ISPSA) 2022 (Pusan, Korea) Invited Speaker

(Oral) Sangyeon Pak, "New Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

Graphene Symposium 2022 (Pusan, Korea) Invited Speaker

(Oral) Sangyeon Pak, "New Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

Asia-Pacific Workshop on Fundamentals and Applications of Advanced Semiconductor Devices (AWAD) 2022 (Pusan, Korea) Invited Speaker

(Oral) Sangyeon Pak, "New Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

Nano Convergence Conference (NCC) 2022 (Gyeonggi Gwangju, Korea) Young Scientist Presentation

(Oral) Sangyeon Pak, "New Copper Sulfide Electrodes for Electronic and Optoelectronic Applications"

Advances in Functional Materials (AFM) 2021 (Jeju, Korea) Invited Speaker, Session Chair

(Oral) Sangyeon Pak, "One-Pot Synthesis of Two-Dimensional Heterostructures"

Nano Convergence Conference (NCC) 2021 (Gyeonggi Gwangju, Korea) Young Scientist Presentation

(Oral) Sangyeon Pak, "Strain Engineering in Two-dimensional Transition Metal Dichalcogenides"

7th Korea-Japan Joint Symposium on Advanced Solar Cells 2020 (Suwon, South Korea) Invited Speaker

(Oral) Sangyeon Pak, "Engineered Heterojunction for high-performance optoelectronic devices"

International Conference on Advanced Electromaterials (ICAE) 2019 (Jeju, South Korea) Invited Speaker

(Oral) Sangyeon Pak, "Tailoring properties of monolayered MoS₂ for flexible photodetectors"

Nano Korea 2019 (Kintex, South Korea) Invited Speaker

(Oral) Sangyeon Pak, "Efficient Charge Separation Mechanisms in MoS₂/Quantum Dot Hybrid Phototransistors"

Oxford Photonics Day 2018 (Oxford, United Kingdom)

(Poster) Sangyeon Pak et al. "Strain effects on the excitonic behaviors in an epitaxially-grown van der Waals heterobilayer"

UK Semiconductors 2017 (The University of Sheffield, United Kingdom)

(Oral) Sangyeon Pak et al. "Monolayer optical memory cells based on artificial trap-mediated charge storage and release"

(Poster) Sangyeon Pak et al. "Strain-dependent coupled photoluminescence behaviors in epitaxially-grown MoS₂-WS₂ van der Waals heterobilayers"

Europe-Korea Conference (EKC) 2017 (Stockholm, Sweden)

(Poster) Sangyeon Pak et al. "2D layered materials for future flexible optoelectronic nanodevices" (Best Poster Award)

KSEAUK 2017 (Oxford, United Kingdom)

(Poster) Sangyeon Pak et al. "Strain-mediated interlayer coupling effects on the excitonic behaviors in an epitaxially-grown MoS₂/WS₂ van der Waals heterobilayer"

Awards

2022	POSCO Science Fellowship
2017	Best Poster Award , 10 th Europe-Korea Conference on Science and Technology (Sweden)
2010 – 2014	Dean's honor list , University of Wisconsin-Madison (7 semesters)

Activities

2022 -	Editorial Member of "Current Applied Physics"	Elsevier
2021 – 2022	Assigned Guest editor of 'Nanomaterials'	Molecular Diversity Preserv. Internat. (MDPI)
2020 – Present	Assigned Reviewer Board of 'Nanomaterials'	Molecular Diversity Preserv. Internat. (MDPI)

References

Prof. SeungNam Cha
(Ph.D. Thesis advisor, Post-doc PI)

Dept. of Physics
Sungkyunkwan Univ.
Suwon, Korea
chasn@skku.edu

Prof. Stephen M. Morris
(Ph.D. Thesis advisor)

Dept. of Engineering Science
Univ. of Oxford
Oxford, UK
stephen.morris@eng.ox.ac.uk

Prof. Jung Inn Sohn
(Ph.D. Thesis advisor)

Dept. of Physics
Dongguk Univ.
Seoul, Korea
junginn.sohn@dongguk.edu

Dr. Kyung-Ho Park
(Vice President)

Korea Advanced Nano Fab
Center (KANC)
Suwon, Korea
kyungho.park@kanc.re.kr