

Kim, Shinho

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EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Postdoctoral Fellow, Information & Electronics Research Institute	Daejeon Mar. 2022 – Present
Korea Advanced Institute of Science and Technology (KAIST) Ph.D., School of Electrical Engineering	Daejeon Sep. 2016 – Feb. 2022
Korea Advanced Institute of Science and Technology (KAIST) M.S., School of Electrical Engineering	Daejeon Mar. 2014 – Aug 2016
Kyungpook National University (KNU) B.S., School of Electronics Engineering College	Daegu Mar. 2009 – Feb 2014

RESEARCH

Research Topics in Postdoc Revealing fundamental aspect of thermal emission in metasurface Electrically tunable graphene thermal emitter Electrically tunable graphene spatial modulator Robust and efficient graphene modulator Phase change material-based active metasurface Analysis and calculation of complex random optical structure	2022-Present
Research Topics in Ph.D. Electrically tunable graphene thermal emitter Electrically tunable graphene metasurface Robust and Efficient graphene metasurface Ultracompact electro-optic waveguided modulator Complex random optical structure	2016-2022
Research Topics in M.S. Band-edge photonic crystal laser Metamaterials using mechanical change of phase change material Quantum effect in sub-nm plamonic structure Photothermal switch based on phase change and metal materials	2014-2016

MAIN PROJECTS

- National Research Foundation of Korea** 2022 – Present
Basic Science Research Program - Creative challenge research support
Basic research of thermal emission and design thermal emission steering device
Principal investigator
- Global Frontier** 2014 – 2016
Center for Advanced Meta-Materials
Mechanically reconfigurable metamaterial by phase change material
- Creative Materials Discovery Program** 2017 – 2022
Center for Advanced Materials Discovery for 3D Displays
Collaboration works with research groups in department of materials science and engineering
- SAMSUNG Project** 2017 – Present
Mid-infrared electro-optic spatial modulator based on graphene electrode
- National Research Foundation of Korea** 2019-2020
2019 Basic Research International Exchange and Cooperation

AWARDS

- Outstanding PhD Thesis Award 2021
Kim Choong-Ki Award: Best Research Achievement Award 2019
Excellent Paper Award COOC 2016

JOURNAL ARTICLES

1. J Siegel⁺, **S Kim**⁺, M Fortman, P Hon, L Sweatlock, MS Jang*, VW Brar*
Electrostatic Steering of Thermal Emission with Active Metasurface Control of Delocalized Modes
Submitted arXiv:2308.07998.
2. JH Lee⁺, Y Ahn⁺, HE Lee, YN Jang, AY Park, **S Kim**, YH Jug, SH Sung, JH Shin, SH Lee, SH Park, KS Kim, MS Jang, BJ Kim*, SH Oh*, Lee KJ*
Wearable surface-lighting micro-light-emitting diode patch for melanogenesis inhibition
Adv. Healthc. Mater. 12, 2201796, 2023.
3. JY Kim, J Park, GR Holdman, JT Heident, **S Kim**, MS Jang*, and VW Brar*
Full 2π tunable phase modulation using avoided crossing of resonances
Nat. Commun. 13, 2103, 2022.

4. KM Song, **S Kim**, S Kang, TW Nam, GY Kim, H Lim, EN Cho, KH Kim, SH Kwon*, MS Jang*, and YS Jung*
Microcellular sensing media with ternary transparency states for fast and intuitive identification of unknown liquids
Sci. Adv. 7, eabg8013, 2021.
5. **S Kim**, SG Menabde, JD Cox, T Low*, and MS Jang*
Ultracompact electro-optic waveguide modulator based on a graphene-covered $\lambda/1000$ plasmonic nanogap
Opt. Express 29, 938, 2021.
6. TH Im⁺, CH Lee⁺, JC Kim, **S Kim**, M Kim, CM Park, HE Lee, JH Park, MS Jang, DC Lee, SY Choi, HS Wang, HY Jeong*, DY Jeon*, and KJ Lee*
Metastable quantum dot for photoelectric devices via flash-induced one-step sequential self-formation
Nano Energy 84, 105889, 2021.
7. GH Lee⁺, **S Kim**⁺, YJ Kim*, MS Jang*, and YS Jung
Simulation and Fabrication of Nanoscale Spirals Based on Dual-Scale Self-Assemblies
ACS Appl. Mater. interface 12, 46678, 2020.
8. KJ Lee⁺, K Kwon⁺, **S Kim**, W Honh, J Park, K Yu*, and SY Choi*
Gap-Mode Plasmon-Induced Photovoltaic Effect in a Vertical Multilayer Graphene Homojunction
Adv. Opt. Mater 8, 4, 1901519, 2020.
9. S Han⁺, S Kim⁺, **S Kim**, T Low, VW Brar, and MS Jang*
Complete complex amplitude modulation with electronically tunable graphene plasmonic metamolecules
ACS Nano 14, 1166, 2020.
10. GY Kim⁺, **S Kim**⁺, M Kim, H Lim, TW Nam, W Choi, E Cho, HJ Han, C Lee, JC Kim, HY Jeong, SY Choi, MS Jang*, DY Jeon*, and YS Jung*
Order-of-magnitude, Broadband Enhanced Light Emission from Quantum Dots Assembled in Multi-scale Phase-Separated Block Copolymers
Nano Lett. 19, 6827, 2019.
11. KJ Lee⁺, **S Kim**⁺, W Hong, H Park, MS Jang, K Yu*, and SY Choi*
Observation of Wavelength-Dependent Quantum plasmon tunneling with Varying the thickness of Graphene spacer
Sci. Rep. 9, 1199, 2019.
12. CY Jeon⁺, KM Baek⁺, **S Kim**, DJ Kim, MS Jang, YS Jung, and BG Park*
Plasmon-Enhanced Photodetection in Ferromagnet/Nonmagnet Spin Thermoelectric Structures

Adv. Funct. Mater. 28, 1802936, 2018.

13. KM Baek⁺, CY Jeon⁺, **S Kim**, SH Cho, MS Jang, J Oh*, and YS Jung*
Engraving High-Density Nanogaps in Gold Thin Films via Sequential Anodization and Reduction for Surface-Enhanced Raman Spectroscopy Applications
Chem. Mater. 30, 6183, 2018.
14. G Seo, JB You, BJ Kim, J Shin, **S Kim**, K Yu*
Facile photothermal synthesis of localized vanadium oxide capable of extraordinary phase transition
Opt. Mater. Express 7, 2860, 2017.
15. J Park, G Hwang, **S Kim**, J Seo, H Park, K Yu, T Kim, and K Lee*
Flash-Induced Self-Limited Plasmonic Welding of Silver Nanowire Network for Transparent Flexible Energy Harvester
Adv. Mater. 29, 1603473, 2017.

PATENTS

1. (KR102193204)/Date:2020.12.11
0에 가까운 유전율을 가지는 물질을 통한 대형 그래핀 공진기의 구현 방법
Inventor:MS Jang, **S Kim**.
2. (KR102187443)/Date:2020.12.01
광소자 및 그의 제조방법
Inventor:MS Jang, **S Kim**.
3. (KR102162022)/Date:2020.09.25
멀티스케일 기법을 사용해 민감도가 증대된 그래핀 메타표면 기반 분자 감지 센서 및 그 제조 방법
Inventor:MS Jang, H Ha, **S Kim**, S Hang.

INTERNATIONAL CONFERENCES

1. J Siegel, **S Kim**, M Fortman, P Hon, L Sweatlock, MS Jang, VW Brar
Steering of Directional Thermal Emission based on Electrically Tunable Graphene Metasurface Integrated on Delocalized Photonic Mode Resonator
NANOKOREA 2023.
2. J Siegel, **S Kim**, M Fortman, P Hon, L Sweatlock, MS Jang, VW Brar
Electronic Steering of Directional Thermal Emission based on Delocalized Photonic Mode Resonator Combined with Graphene-Metal Hybrid Metasurface
MRS 2023 Spring Meeting.

3. **S Kim**, S Baek, S Min, H Ha, D Seo, J Kim, G Lee, B Min, MS Jang
Realization of large scale graphene plasmonic resonator using epsilon-near-zero substrate
NANOKOREA 2022.
4. **S Kim**, S Menabde, T Low, MS Jang
Efficient plasmonic modulator in a scale of $\lambda/1000$ via nano-gap-based extremely confined cavity modes
Nanophotonics and Micro-Nano Optics International Conference 2019.
5. S Menabde, **S Kim**, H Ha, MS Jang
Ultra-compact optical switch based on Fano resonance in graphene-functionalized plasmonic nano-cavity
SPIE Optics + Photonics 2018.