

# Taegun Kim Ph.D.

# SAMSUNG

## *Advanced Component Integration Lab.*



Senior Researcher,  
Mobile eXperience,  
**Samsung Electronics**  
416, Maetan-3Dong, Yeongtong-Gu,  
Suwong-Si, Gyeonggi-Do, 443, Korea  
E-mail: [taegun23.kim@samsung.com](mailto:taegun23.kim@samsung.com)

## RESEARCH INTERESTS

- **Thin film coating process:** Cold Gas Dynamic Spray (CGDS) & Aerosol Deposition (AD), Electro-Spinning & Plating, Atomic Layer Deposition (ALD).
- **Thermal hot spot:** Heat-dissipation, Radiative heat-transfer.
- **Energy storage:** Lithium-ion battery(Anode), Supercapacitor.
- **Energy harvester:** Piezoelectric-nanogenerators(PENGs)
- **Materials research:** Graphene (Multi-sensors, TCO, Heat sink), Ceramic(TiO<sub>2</sub>), Metal (Ni, CuO, Fe<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>), AgNW (Silver Nanowire, Transparent Conducting Film, Multi-Functional Sensor).

## EDUCATION

- Ph. D. course in Mechanical Engineering, Aug. 2022,  
**Korea University**, Seoul, Korea  
Advisor: Prof. Sam S. Yoon
- Master course in Mechanical Engineering, Feb. 2018,  
**Korea University**, Seoul, Korea  
Advisor: Prof. Sam S. Yoon
- Bachelor of Mechanical System Design Engineering, Feb. 2016,  
**Seoul National University of Science and Technology**, Seoul, Korea  
Advisor: Prof. Seong-Dong Kim

## AWARD

- 2021 KU Achievement Award, Korea University, Feb./2022
- Scholarship for the Encouragements of Research, College of Engineering, Korea University, Feb./2022
- Best Paper Award, Graduate School, Korea University, Feb./2022
- Best Paper Award, Graduate School, Korea University, Aug./2021
- Scholarship for the Encouragements of Research, college of Engineering, Korea University, Feb./2021
- Best Paper Award, Graduate School, Korea University, Feb./2021
- Outstanding Graduate Student Award, School of Mechanical Engineering, Korea University, 2020

## EMPLOYMENT

- 2016/Aug. to 2016/Dec.: Teaching Assistant, School of Mechanical Engineering, ***Korea University***,

- Creativity in machine design: Capstone design.
- 2017/Mar. to 2017/June: Teaching Assistant, School of Mechanical Engineering, *Korea University*, Thermodynamics1.
  - 2017/Aug. to 2017/Dec.: Teaching Assistant, School of Mechanical Engineering, *Korea University*, Thermodynamics2.
  - 2018/Mar. to 2018/June.: Teaching Assistant, School of Mechanical Engineering, *Korea University*, Creativity in machine design: Capstone design.
  - 2018/Aug. to 2018/Dec.: Teaching Assistant, School of Mechanical Engineering, *Korea University*, Thermodynamics2
  - 2019/Mar. to 2019/June: Teaching Assistant, School of Mechanical Engineering, *Korea University*, Thermodynamics1
  - 2020/Mar. to 2020/June: Teaching Assistant, School of Mechanical Engineering, *Korea University*, Creativity in machine design: Capstone design.

## PUBLICATIONS

1. **TG Kim†**, YI Kim, CW Park, A. Aldalbahi, M. El-Newehy, S An\*, SS Yoon\*, Enhancing Solar Radiant Heat Transfer Using Supersonically Sprayed rGO/AgNW Textured Surfaces, *International Journal of Precision Engineering and Manufacturing-Green Technology (IF = 5.671), 2022.*
2. **TG Kim†**, E. Samuel, CW Park, A. Aldalbahi, M. El-Newehy, Y Kang\*, HS Lee\*, SS Yoon\*, Iron oxide supercapacitor of high volumetric energy and power density using binder-free supersonic spraying and self-healing rGO, *Ceramics International (IF = 4.527), 2022.*
3. B. Joshi, E. Samuel, YI Kim, **TG Kim**, A. Aldalbahi, M. El-Newehy, SS Yoon\*, Electrospun zinc-manganese bimetallic oxide carbon nanofibers as freestanding supercapacitor electrodes, *International Journal of Energy Research (IF = 5.164), 2022.*
4. **TG Kim†**, CW Park, E. Samuel, YI Kim, S An\*, SS Yoon\*, Wearable Sensors and Supercapacitors using Electroplated-Ni/ZnO Antibacterial Fabric, *Journal of Materials Science & Technology (IF =8.067), 2022.*
5. YI Kim†, S An, CW Park, **TG Kim†**, M. El-Newehy, MR. Hatshan, SS Yoon\*, Nanotextured Soft Electrothermo-Pneumatic Actuator for Constructing Lightweight, Integrated, and Untethered Soft Robotics, *Soft Robotics (IF =8.071), 2021.*
6. CW Park†, **TG Kim†**, E. Samuel SS Yoon\*, Superhydrophobic antibacterial wearable metallized fabric as supercapacitor, multifunctional sensors, and heater, *Journal of Power Sources (IF =8.247), 2021.*
7. CW Park†, **TG Kim†**, YI Kim, MW Lee, S An, SS Yoon\*, Supersonically sprayed transparent flexible multifunctional composites for self-cleaning, anti-icing, anti-fogging, and anti-bacterial applications, *Composites Part B: Engineering (IF = 7.635), 2021.*
8. **TG Kim†**, CW Park†, SS Yoon\*, Supersonically sprayed washable, wearable, stretchable, hydrophobic, and antibacterial rGO/AgNW fabric for multifunctional sensors and supercapacitors, *ACS Applied Materials & Interfaces (IF=8.758),2021.*
9. **TG Kim†**, E. Samuel†, CW Park, YI Kim, A. Aldalbahi, F. Alotabi, SS Yoon\*, Wearable fabric supercapacitors using supersonically sprayed reduced graphene and tin oxide, *Journal of Alloys and Compounds (IF=4.650), 2021.*
10. CW Park†, **TG Kim†**, YI KIM, A. Aldalbahi, MR Hatshan, S An, SS Yoon\*, Pool boiling enhancement using hierarchically structured ZnO nanowires grown via electro spraying and chemical bath deposition, *Applied Thermal Engineering (IF=4.725), 2021.*
11. **TG Kim†**, S An†, SS Yoon\*, Flexible heat-spreading and air-cooling films using nickel-electroplated nanotextured fibers, *Applied Thermal Engineering (IF=4.725), 2020.*
12. **TG Kim†**, S An\*, CW Park, J. Choi, A. L. Yarin\*. SS Yoon\*, Flexible heat-spreading and air-cooling films using nickel-electroplated nanotextured fibers, *Chemical Engineering Science (IF=3.871), 2020.*
13. **TG Kim†**, CW Park†, S An\*, SS Yoon\*, Highly nanotextured nickel-electroplated bismuth vanadate micropillars for hotspot removal via air and spray cooling, antibacterial, heating, and multi-sensor features,

- International Journal of Heat and Mass Transfer (IF=4.346), 2020.**
14. CS Ahn†, DY Kim†, CW Park, MW Kim, **TG Kim**, S An\*, SS Yoon\*, Experimental and numerical study of smoke behavior in high-rise stairwells with open and closed windows, **International Journal of Thermal Sciences (IF=3.476), 2020.**
  15. **TG Kim†**, CW Park, SS Yoon\*, Supersonically sprayed carbon nanotubes and silver nanowires as efficient heat spreaders and cooling films, **Journal of Applied Physics (IF=2.328), 2020.**
  16. **TG Kim†**, E. Samuelt, B. Joshi, CW Park, MW Kim, Mark T. Swihart, Sam S. Yoon\*, Highly Efficient Water Splitting Photoanodes using Carbon Nanotube-decorated Supersonically Sprayed Zn<sub>2</sub>SnO<sub>4</sub>, **Journal of Alloys and Compounds (IF=4.175), 2020.**
  17. CW Park†, E Samuelt, BN Joshi, **TG Kim**, A Aldalbahi, M El-Newehy, WY Yoon, SS Yoon\*, Supersonically sprayed Fe<sub>2</sub>O<sub>3</sub>/C/CNT composites for highly stabilized Li-ion battery anodes, **Chemical Engineering Journal (IF=10.652), 2020.**
  18. CW Park†, **TG Kim†**, MW Kim, A. Aldalbahi, M. El-Newehy, SS Yoon\*, Splash suppression during wafer wet cleaning through drop penetration across metal meshes and porous fiber mats, **Journal of Visualization (IF=0.926), 2020.**
  19. E Samuelt, CW Park†, **TG Kim**, BN Joshi, A Aldalbahi, H Alanzi, MT Swihart, WY Yoon, SS Yoon\*, Dodecahedral ZnO/C framework on reduced graphene oxide sheets for high-performance Li-ion battery anodes, **Journal of Alloys and Compounds (IF=4.650), 2020.**
  20. E. Samuelt, **TG Kim†**, CW Park, B. Joshi, Mark T. Swihart, SS. Yoon\*, Supersonically sprayed Zn<sub>2</sub>SnO<sub>4</sub>/SnO<sub>2</sub>/CNT nanocomposites for high-performance supercapacitor electrodes, **ACS Sustainable Chemistry & Engineering (IF=6.970), 2019.**
  21. DH Cho†, HS Jo†, WJ Lee, **TG Kim**, BH Shin, SS Yoon\*, YD Chung, Enhanced electrical conductivity of transparent electrode using nickel microfiber and silver nanowires hybrid networks for gridless thin-film solar cells, **Solar Energy Materials and Solar Cells (IF=6.984), 2019.**
  22. CS Ahn†, CW Park†, MW Kim, **TG Kim**, S. C. James, Y Yoon, A. L. Yarin, SS. Yoon\*, Experimental and numerical investigation of smoke dynamics in vertical cylinders and open-air environment, **International Journal of Heat and Mass Transfer (IF=3.458), 2019.**
  23. HS Jo†, E. Samuelt, HJ Kwon, B. Joshi, MW Kim, **TG Kim**, Mark T. Swihart, SS. Yoon\*, Highly flexible transparent substrate-free photoanodes using ZnO nanowires on nickel microfibers, **Chemical Engineering Journal (IF=6.735), 2019.**
  24. B. Joshi†, E. Samuelt, Min-Woo Kim, Karam Kim, **TG Kim**, Mark T Swihart, Woo Young Yoon, Sam S Yoon, Electrospayed graphene films decorated with bimetallic (zinc-iron) oxide for lithium-ion battery anodes, **Journal of Alloys and Compounds (IF=3.779), 2019.**
  25. **TG Kim†**, E. Samuelt, B. Joshi, CW Park, MW Kim, WY Yoon\*, Sam S. Yoon\*, Supersonically Sprayed Iron Oxide Nanoparticles with Atomic Layer-deposited ZnO/TiO<sub>2</sub> Layers for Solar Water Splitting, **Journal of Alloys and Compounds (IF=4.175), 2019.**
  26. E. Samuelt, B Joshi†, MW Kim, YI Kim, S Park, **TG Kim**, MT Swihart, Sam S. Yoon\*, Zeolitic imidazolate framework-8 derived zinc oxide/carbon nanofiber as freestanding electrodes for lithium storage in lithium-ion batteries, **Journal of Power Sources (IF = 6.945), 2018**
  27. YI Kim†, E. Samuelt, B. Joshi, MW Kim, **TG Kim**, Mark T. Swihart, SS. Yoon, Highly efficient electrodes for supercapacitors using silver-plated carbon nanofibers with enhanced mechanical flexibility and long-term stability, **Chemical Engineering Journal (IF=6.735), 2018.**
  28. MW Kim†, B. Joshi†, E. Samuel, KR Kim, YI Kim, **TG Kim**, Mark T. Swihart, SS. Yoon\*, Highly nanotextured b-Bi<sub>2</sub>O<sub>3</sub> pillars by electrostatic spray deposition as photoanodes for solar water splitting, **Journal of Alloys and Compounds (IF=3.133), 2018.**
  29. **TG Kim†**, E. Samuelt, B. Joshi, CW Park, MW Kim, WY Yoon\*, Sam S. Yoon\*, Supersonically Sprayed rGO-Zn<sub>2</sub>SnO<sub>4</sub> Composites as Flexible, Binder-free, Scalable, and High-Capacity Lithium Ion Battery Anodes, **Journal of Alloys and Compounds (IF=3.779), 2018.**
  30. SD Kim†, JG Lee, **TG Kim**, K. Rana, JY Jeong, JH Park, SS Yoon, JH Ahn\*, Additive-free electrode fabrication with reduced graphene oxide using supersonic kinetic spray for flexible lithium-ion batteries, **Carbon (IF=7.082), 2018.**
  31. MW Kim†, SP An†, KR Kim, **TG Kim**, HS Jo, DH Park, SS. Yoon, Packing of metalized polymer nanofibers for aneurysm embolization, **Nanoscale (IF=7.367), 2018.**

32. MW Kim†, **TG Kim†**, HS Jo, JG Lee, SC James, MS Choi, WY Kim, JS Yang, J Choi, SS. Yoon\*, Nano-textured Surfaces using Hybrid Micro- and Nano-Materials for Efficient Water Cooling, *International Journal of Heat and Mass Transfer (IF=3.458), 2018.*
33. HS Jo†, **TG Kim†**, JG Lee, HG Park, SC James, JH Choi, SS Yoon\*, supersonically sprayed nanotextured surface with silver nanowires for enhanced pool boiling, *International Journal of Heat & Mass Transfer (IF=3.458), 2018.*
34. YI Kim†, S An†, MW Kim, HS Jo, **TG Kim**, AL Yarin\*, SS Yoon\*, Spiky Cactus-Like Nickel-Silver Core-Shell Microfibers for Flexible Electronics, *Nanoscale (IF=7.367), 2018.*
35. B. Joshi†, E. Samuelt, **TG Kim**, CW Park, YI Kim, Mark T. Swihart, WY Yoon\*, SS Yoon\*, Supersonically spray-coated zinc ferrite/graphitic-carbon nitride composite as a stable high-capacity anode material for lithium-ion batteries, *Journal of Alloys and Compounds (IF=3.779), 2018.*
36. HS Jo†, MW Kim†, **TG Kim**, S An, HG Park, JG Lee, SC James, JH Choi\*, SS Yoon\*, Supersonically spray-coated copper meshes as textured surface for pool boiling, *International Journal of Thermal Sciences (IF=3.615), 2018.*
37. **TG Kim†**, JG Lee†, CW Park, HS Jo, MW Kim, DH Cho, YD Chung\*, SS Yoon\*, Effect of supersonic spraying impact velocity on opto-electric properties of transparent conducting flexible films consisting of silver nanowire, ITO, and polyimide multilayers, *Journal of Alloys and Compounds (IF=3.779), 2017.*
38. **TG Kim†**, JG Lee†, CW Park, JH Choi, SC James, MS Choi, WY Kim, JS Yang, KH Kim, SS Yoon\*, Supersonically sprayed clay, silica, and silica aerogel hybrid films as thermal and electrical barriers, *Ceramics International (IF=3.450), 2018.*
39. JG Lee†, SP An†, **TG Kim**, MW Kim, HS Jo, Mark T. Swihart, AL Yarin\*, SS Yoon\*, Self-Cleaning Anticondensing Glass via Supersonic Spraying of Silver Nanowires, Silica, and Polystyrene Nanoparticles, *ACS Applied Materials & Interfaces (IF=7.145), 2017.*
40. HS Jo†, JG Lee†, **TG Kim**, SP An, SC James, JH Choi, SS Yoon\*, Supersonically sprayed, triangular copper lines for pool boiling enhancement, *Int. J. Heat & Mass Transfer (IF=3.458), 2017.*
41. B Joshi†, JG Lee†, E Samuel, **TG Kim**, WY Yoon\*, SS Yoon\*, Supersonically Blown reduced graphene oxide intertwined Fe-Fe<sub>3</sub>C nanofibers for lithium ion battery anodes, *Journal of Alloys and Copounds (IF=3.779), 2017.*
42. E Samuelt, JG Lee†, B Joshi, **TG Kim**, MW Kim, IW Seong, WY Yoon\*, SS Yoon\*, Supersonic Cold Spraying of Titania Nanoparticles on Reduced Graphene Oxide for Lithium Ion Battery Anodes, *Journal of Alloys and Copounds (IF=3.133), 2017.*
43. JG Lee†, DY Kim†, **TG Kim**, JH Lee, SS. Al-Deyab, HW Lee, JS Kim, DH Yang, AL. Yarin\*, SS Yoon\*, Supersonically Sprayed Copper-Nickel Microparticles as Flexible and Printable Thin-Film High-Temperature Heaters, *Advanced Materials Interfaces (IF=4.279), 2017.*
44. JG Lee†, JH Lee†, S An, DY Kim, **TG Kim**, SS. Al-Deyab, A Yarin, SS Yoon\*, “Highly Flexible, Stretchable, Wearable, Patternable, Transparent Heaters on Complex 3D Surface formed from Supersonically Sprayed Silver Nanowires, *Journal of Materials Chemistry A (IF=8.867), 2016.*
45. JG Lee†, B Joshi†, JH Lee, **TG Kim**, DY Kim, SS. Al-Deyab, IW Seong, Mark T. Swihart, WY Yoon, SS Yoon\*, Stable High-Capacity Lithium Ion battery Anodes Produced by Supersonic Spray Deposition of Hematite Nanoparticles and Self-Healing Reduced Graphene Oxide, *Electrochimica Acta (IF=4.803) 2016.*

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## PRESENTATIONS

1. **Tae-Gun Kim**, Efficient eliminate the hot spot using supersonically sprayed graphene and silver nanowire, ICEES, Perth, Australia, Jan. 08-10, 2020.
2. **Tae-Gun Kim**, Sprayed for Water Splitting of Photoanodes using ball-milled Zn<sub>2</sub>SnO<sub>4</sub> nanoparticles with CNTs, ICNSE, Fukuoka, Japan, Feb. 24-27, 2019.
3. **Tae-Gun Kim**, Supersonically Sprayed Nickel-Copper Microparticles as Flexible and Printable Thin-Film High-Temperature Heaters, International Conference on Liquid Atomization & Spray

- Systems (ICLASS), Chicago, USA, July. 22-26, 2018.
4. **Tae-Gun Kim**, Supersonically-Sprayed Aerogel and Clay particles as Thermal Barrier Films., Tokyo, Japan, Nov. 4-6th, 2017.
  5. **Tae-Gun Kim**, Supersonically-Sprayed Aerogel and Clay Particles as Thermal Barrier Films, The 3<sup>rd</sup> UIC-KU Conference, Chicago, USA, Apr. 20-21th, 2017
  6. **Tae-Gun Kim**, Anti-condensing, Thermally-insulating, and Self-cleaning Glass by Supersonic Spraying of Silver Nanowires, Silica, and Polystyrene Nanoparticles, Pusan, Korea, Nov. 6-7th, 2017
  7. **Tae-Gun Kim**, The Electrical and Mechanical Properties of kinetic Sprayed Ni-Cu Electrodes, Gwang-Ju, Korea, Mar. 14-15th, 2017.
  8. **Tae-Gun Kim**, Supersonic sprayed Fe-Fe<sub>3</sub>C nanofibers entangled with reduced graphene oxide for lithium ion battery anodes, Hong Kong, China, Jan. 19-21th, 2017

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## SKILLS

- Technique: **SEM** (Scanning electron microscopy), **EDX** (Energy dispersive x-ray spectroscopy), **AFM** (Atomic force microscopy), **XRD** (X-ray diffraction), **XPS** (X-ray photoelectron spectroscopy), **FTIR** (Fourier transform infrared spectroscopy), **Raman spectroscopy**, **UV-VIS spectrometer**, **TEM** (Transmission electron microscopy).
- Device fabrication: Aerosol deposition, Cold spray thin film deposition, Electro-Spinning & Spray, Atomic Layer Deposition.

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## REFERENCE

- Samsung Electronics Group