

TAEGUN KIM

Doctor Course

Solar Cell & Aerosol Science Laboratory



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RESEARCH INTERESTS

- **Thin film coating process:** Cold Gas Dynamic Spray (CGDS) & Aerosol Deposition (AD), Electro-Spinning & Plating.
- **Thermal hot spot:** Heat-dissipation, Radiative heat-transfer.
- **Energy storage:** Lithium-ion battery (Anode), Supercapacitor.
- **Photocatalysis applications:** Water purification, Self-cleaning, Water splitting.
- **Materials research:** Graphene (Multi-sensors, TCO, Heat sink), Ceramic (TiO₂), Metal (Ni, CuO, Fe₂O₃, Al₂O₃), AgNW (Silver Nanowire, Transparent Conducting Film, Multi-Functional Sensor).

EDUCATION

- Ph. D. course in Mechanical Engineering (Mar. 2018~)
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

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**, Thermodynamics 1.
- 2017/Aug. to 2017/Dec.: Teaching Assistant, School of Mechanical Engineering, **Korea University**, Thermodynamics 2.
- 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**, Thermodynamics 2.
- 2019/Mar. to 2019/June: Teaching Assistant, School of Mechanical Engineering, **Korea University**,

PUBLICATIONS

1. **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.*
2. **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.*
3. CW Park†, **TG Kim†**, 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.*
4. **TG Kim†**, Sp Ant†, SS Yoon*, Flexible heat-spreading and air-cooling films using nickel-electroplated nanotextured fibers, *Applied Thermal Engineering (IF=4.725), 2020.*
5. **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.*
6. **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.*
7. 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.*
8. **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.*
9. **TG Kim†**, E. Samuel†, B. Joshi, CW Park, MW Kim, Mark T. Swihart, Sam S. Yoon*, Highly Efficient Water Splitting Photoanodes using Carbon Nanotube-decorated Supersonically Sprayed Zn₂SnO₄, *Journal of Alloys and Compounds (IF=4.175), 2020.*
10. CW Park†, E Samuel†, BN Joshi, **TG Kim**, A Aldalbahi, M El-Newehy, WY Yoon, SS Yoon*, Supersonically sprayed Fe₂O₃/C/CNT composites for highly stabilized Li-ion battery anodes, *Chemical Engineering Journal (IF=10.652), 2020.*
11. 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.*
12. E Samuel†, 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.*
13. E. Samuel†, **TG Kim†**, CW Park, B. Joshi, Mark T. Swihart, SS. Yoon*, Supersonically sprayed Zn₂SnO₄/SnO₂/CNT nanocomposites for high-performance supercapacitor electrodes, *ACS Sustainable Chemistry & Engineering (IF=6.970), 2019.*
14. DH Cho†, HS Jo†, WJ Lee, **TG Kim**, BH Shin, SS Yoon*, 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.*
15. 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.*
16. HS Jo†, E. Samuel†, 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.*
17. Bhavana Joshi†, Edmund Samuel†, Min-Woo Kim, Karam Kim, **TG Kim**, Mark T Swihart, Woo Young Yoon, Sam S Yoon, Electro sprayed graphene films decorated with bimetallic (zinc-iron) oxide for lithium-ion battery anodes, *Journal of Alloys and Compounds (IF=3.779), 2019.*

18. **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/TiO₂ Layers for Solar Water Splitting, *Journal of Alloys and Compounds (IF=4.175), 2019.*
19. 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*
20. 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.*
21. MW Kim†, B. Joshi†, E. Samuel, KR Kim, YI Kim, **TG Kim**, Mark T. Swihart, SS. Yoon*, Highly nanotextured b-Bi₂O₃ pillars by electrostatic spray deposition as photoanodes for solar water splitting, *Journal of Alloys and Compounds (IF=3.133), 2018.*
22. **TG Kim**†, E. Samuelt, B. Joshi, CW Park, MW Kim, WY Yoon*, Sam S. Yoon*, Supersonically Sprayed rGO-Zn₂SnO₄ Composites as Flexible, Binder-free, Scalable, and High-Capacity Lithium Ion Battery Anodes, *Journal of Alloys and Compounds (IF=3.779), 2018.*
23. 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.*
24. 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.*
25. MW Kim†, **TG Kim**†, HS Jo, JG Lee, SC James, MS Choi, WY Kim, JS Yang, J Choi, SS. Yoon*, Nanotextured Surfaces using Hybrid Micro- and Nano-Materials for Efficient Water Cooling, *International Journal of Heat and Mass Transfer (IF=3.458), 2018.*
26. 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.*
27. 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.*
28. 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.*
29. 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.*
30. **TG Kim**†, JG Leet†, 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.*
31. **TG Kim**†, JG Leet†, 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.*
32. JG Leet†, 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.*
33. HS Jo†, JG Leet†, **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.*
34. B Joshi†, JG Leet†, E Samuel, **TG Kim**, WY Yoon*, SS Yoon*, “Supersonically Blown reduced graphene oxide intertwined Fe-Fe₃C nanofibers for lithium ion battery anodes” *Journal of Alloys and Copounds (IF=3.779), 2017.*
35. E Samuelt, JG Leet†, 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.*
36. JG Leet†, 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**.
37. 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**.
38. JG Lee†, B Joshit†, 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**.

PRESENTATIONS

1. **Tae-Gun Kim**, Sprayed for Water Splitting of Photoanodes using ball-milled Zn₂SnO₄ nanoparticles with CNTs, ICNSE, Fukuoka, Japan, Feb. 24-27, 2019.
2. **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.
3. **Tae-Gun Kim**, Supersonically-Sprayed Aerogel and Clay particles as Thermal Barrier Films., Tokyo, Japan, Nov. 4-6th, 2017.
4. **Tae-Gun Kim**, Supersonically-Sprayed Aerogel and Clay Particles as Thermal Barrier Films, The 3rd UIC-KU Conference, Chicago, USA, Apr. 20-21th, 2017
5. **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
6. **Tae-Gun Kim**, The Electrical and Mechanical Properties of kinetic Sprayed Ni-Cu Electrodes, Gwang-Ju, Korea, Mar. 14-15th, 2017.
7. **Tae-Gun Kim**, Supersonic sprayed Fe-Fe₃C nanofibers entangled with reduced graphene oxide for lithium ion battery anodes, Hong Kong, China, Jan. 19-21th, 2017

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.

REFERENCE

- Sam S. Yoon
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