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RESEARCH INTERESTS

- **Water splitting for Photocatalyst:** BiVO₄, WO₃/BiVO₄, In₂O₃/Bi₂WO₆, CIGS, CuO,
- **Solar cell application:** Nano-particle(CIGS) coating Thin film, Solution-type(CIS/CIGS) coating Thin film Solar cell(II-Gen), CIS 3D nanostructure
- **Superhydrophobic application:** Al₂O₃
- Electrohydrodynamics spray for thin-film applications
- Electro-spinning for nano-fiber applications
- Fluidic heat and mass transfer
- Electrostatic precipitator, filter system using nano-fiber application
- Manufacture of cerebral aneurysm platinum coil for commercialization (medical device)

EDUCATION

- **PhD Candidate of Science**, Feb. 2020
Mechanical Engineering, Korea University, Seoul, Korea
Advisor: Prof. Sam Sukgoo Yoon
- **Master of Science**, Aug. 2016
Green School (Graduate School of Energy and Environment), Korea University, Seoul, Korea
Advisor: Prof. Sam Sukgoo Yoon
- **Bachelor of Science** in Mechanical Engineering, Feb. 2014
Hanyang University, Seoul, Korea

PUBLICATION

International Journal Papers

1. CS Ahn, **MW Kim**, SP An, YB Yoon, AL Yarin, SS Yoon*, Large-scale solar energy-powered air plumes rising from black tethered balloons for pollutant removal, Applied Thermal Engineering, **under preparation**
2. CS Ahn, **MW Kim**, AL Yarin, SS Yoon*, Analytical theory of natural convection flows in vertical shafts and pipes, Applied Thermal Engineering, **under preparation**
3. **MW Kim**, SP An*, HJ, Seok, AL Yarin, SS Yoon*, MOF fiber for air filtration, Journal of Membrane Science, **under preparation**
4. **MW Kim**, SP An*, HJ, Seok, AL Yarin, SS Yoon*, Efficient air filtration using various metallized microfibers for various particle types, Journal of Membrane Science, **under preparation**
5. BN Joshi, E Samuel, **MW Kim**, MT Swihart, SS Yoon*, Morphology engineering of photoelectrodes for efficient photoelectrochemical water splitting, Progress in Materials Science,

- submitted**
6. TG Kim, CW Park, **MW Kim**, SP An*, SS Yoon*, Highly textured bismuth vanadate micro-pillars electroplated with nickel as hotspot remover in air and spray cooling, *Int. J. Heat and Mass Transfer*, **submitted**
 7. CS Ahn, DY Kim, CW Park, **MW Kim**, TG Kim, BH Bang, SP An, AL Yarin, SS Yoon*, Experimental and numerical investigation on various smoke dynamics scenarios inside highrise buildings with stairs and windows, *Applied Thermal Engineering*, **submitted**
 8. 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*, Submitted
 9. **MW Kim**, E Samuel, BN Joshi, HJ Seok, SS Yoon*, ZnO nanorods garnished with electrospayed MnO₂ and hierarchically passivated by ultrathin TiO₂ for solar water splitting, *Journal of Alloys and Compounds*, **submitted**
 10. TG Kim, BN Joshi, CW Park, E Samuel, **MW Kim**, MT Swihart, SS Yoon*, Supersonically sprayed Zn₂SnO₄/SnO₂/Carbon nanotube films for high efficiency water splitting photoanodes, *Journal of Alloys and Compounds*, **under revision**
 11. CW Park, TG Kim, **MW Kim**, A Aldalbahi, M El-Newehy, SS Yoon*, Splash suppression in wafer wet-cleaning by drop penetration across metal meshes and fiber mats, *Journal of Visualization*, 2019, published online
 12. **MW Kim**, S An, H Seok, H Jung, DH Park, AL Yarin, SS Yoon, In Vitro Evaluation of Pt-Coated Electrospun Nanofibers for Endovascular Coil Embolization, *Acta Biomaterialia*, 2019, published online
 13. CS Ahn, CW Park, **MW Kim**, TG Kim, SC James, AL Yarin, SS Yoon*, Experimental and numerical investigation of smoke dynamics in vertical cylinders and open-air environment, *Int. J. Heat and Mass Transfer*, 135, 985-995, 2019
 14. YI Kim, SP An, **MW Kim**, HS Jo, TG Kim, AL Yarin, SS Yoon*, Highly transparent, conducting, body-attachable metallized fibers as a flexible and stretchable film, *Journal of Alloys and Compounds*, 790, 1127-1136, 2019
 15. E Samuel, BN Joshi, **MW Kim**, YI Kim, MT Swihart, SS Yoon, Hierarchical zeolitic imidazolate framework-derived manganese-doped zinc oxide decorated carbon nanofiber electrodes for high performance flexible supercapacitors, *Chemical Engineering Journal*, 371, 657-665, 2019
 16. TG Kim, BN Joshi, CW Park, E Samuel, **MW Kim**, MT Swihart, SS Yoon*, Supersonically sprayed iron oxide nanoparticles with atomic layer-deposited ZnO/TiO₂ layers for solar water splitting, *Journal of Alloys and Compounds*, 798, 35-44, 2019
 17. **MW Kim**, S An, H Seok, SS Yoon, AL Yarin, Electrostatic Transparent Air Filter Membranes Composed of Metallized Microfibers for Particulate Removal, *ACS applied materials & interfaces*, 11, 26323-26332, 2019
 18. HS Jo, E Samuel, HJ Kwon, BN Joshi, **MW Kim**, TG Kim, MT Swihart, SS Yoon*, Highly flexible transparent photoelectrochemical substrate-free photoanodes using ZnO nanowires on nickel microfibers, *Chemical Engineering Journal*, 363, 13-22, 2019
 19. KY Bae, **MW Kim**, BH Kim, SH Cho, SS Yoon, WY Yoon, Effect of electrostatic spray deposited nafion coating on non-lithiated LiV₃O₈ cathode in lithium-metal rechargeable batteries, *Solid State Ionics*, 331, 66-73, 2019
 20. CS Ahn, BH Bang, **MW Kim**, HS Jo, AL Yarin, SS Yoon*, Theoretical, numerical, and experimental investigation on smoke dynamics in high rise buildings, *Int. J. Heat and Mass Transfer*, 135, 604-613, 2019
 21. BN Joshi, E Samuel, **MW Kim**, K Kim, WY Yoon, SS Yoon*, Electrospayed graphene films decorated with bimetallic (zinc-iron) oxide for lithium-ion battery anodes, *Journal of Alloys and Compounds*, 782, 699-708, 2019
 22. BH Bang, CS Ahn, YT Kim, MH Lee, **MW Kim**, AL Yarin, SS Yoon, Deflagration-to-detonation transition in pipes: The analytical theory, *Applied Mathematical Modelling*, 66, 332-343, 2019
 23. CS Ahn, BH Bang, **MW Kim**, TG Kim, SC James, AL Yarin, SS Yoon*, Numerical investigation on smoke dynamics in unconfined and confined environments, *Int. J. Heat and Mass Transfer*, 127, 571-582, 2018

24. YI Kim, E Samuel, BN Joshi, **MW Kim**, TG Kim, SS Yoon*, Highly efficient electrodes for supercapacitors using silver-plated carbon nanofibers with enhanced mechanical flexibility and long-term stability, *Chemical Engineering Journal*, 353, 189-196, 2018
25. BN Joshi, E Samuel, YI Kim, **MW Kim**, HS Jo, MT Swihart, WY Yoon, SS Yoon*, Hierarchically designed ZIF8 derived Ni@ZnO/ carbon nanofiber freestanding composite for steady lithium storage, *Chemical Engineering Journal*, 351, 127-134, 2018
26. HS Jo, **MW Kim**, SP An, HG Park, JG Lee, TG Kim, SC James, J Choi, SS Yoon*, Effect of supersonically-sprayed frustum-pyramid pillars on pool boiling enhancement, *International Journal of Thermal Sciences*, 132, 26-33, 2018
27. HS Jo[†], **MW Kim**[†], TG Kim, S An, HG Park, JG Lee, SC James, J Choi*, SS Yoon*, Supersonically spray-coated copper meshes as textured surface for pool boiling, *International Journal of Thermal Sciences*, 132, 26-33, 2018
28. **MW Kim**, BN Joshi, E Samuel, K Kim, YI Kim, TG Kim, MT Swihart, SS Yoon, Highly Nanotextured β -Bi₂O₃ Pillars by Electrostatic Spray Deposition as Photoanodes for Solar Water Splitting, *Journal of Alloys and Compounds*, 764, 881-889, 2018
29. **MW Kim**, K Kim, BN Joshi, E Samuel, HS Jo, MT. Swihart, SS Yoon, Tuning the Morphology of Electrospayed BiVO₄ from Nanopillars to Nanoferns via pH Control for Solar Water Splitting, *Journal of Alloys and Compounds*, 769, 193-200, 2018
30. TG Kim, E Samuel, BN 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*, 766, 331-340, 2018
31. E Samuel, PU. Londhe, BJ, **MW Kim**, K Kim, MT Swihart, NB Chaure, SS Yoon, Electrospayed graphene decorated with ZnO nanoparticles for supercapacitors, *Journal of Alloys and Compounds*, 741, 781-791, 2018
32. HS Jo, TG Kim, JG Lee, **MW Kim**, HG Park, SC James, J Choi, SS. Yoon, Supersonically sprayed nanotextured surfaces with silver nanowires for enhanced pool boiling, *International Journal of Heat and Mass Transfer*, 123, 397-406, 2018
33. BN Joshi, E Samuel, **MW Kim**, SR Park, MT Swihart, WY Yoon, SS Yoon, Atomic-layer-deposited TiO₂-SnZnO/carbon nanofiber composite as a highly stable, flexible and freestanding anode material for lithium-ion batteries, *Chemical Engineering Journal*, 338, 72-81, 2018
34. TG Kim, CW Park, JG Lee, **MW Kim**, MS Choi, WY Kim, JS Yang, SS Yoon, Supersonically sprayed clay, silica, and silica aerogel hybrid films as thermal and electrical barriers, *Ceramics International*, 44, 12934-12939, 2018.
35. BN Joshi, S Park, E Samuel, HS Jo, S An, **MW Kim**, MT Swihart, JM Yun, KH Kim, SS Yoon, Zeolitic imidazolate framework-7 textile-derived nanocomposite fibers as freestanding supercapacitor electrodes, *Electroanalytical Chemistry*, 810, 239-247, 2018
36. **MW Kim**, SP An, KR Kim, MW Lee, AL Yarin, SS Yoon*, Packing of Metalized Polymer Nanofibers for Aneurysm Embolization, *Nanoscale*, 10, 6589-6601, 2018
37. SP An, YI Kim, **MW Kim**, HS Jo, MT Swihart, AL Yarin, SS Yoon*, Oxidation-resistant metallized nanofibers as transparent conducting film and heater, *Acta Materialia*, 143, 174-180, 2018
38. **MW Kim**, JG Lee, HS Jo, TG Kim, 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, *Int. J. Heat and Mass Transfer*, 123, 1120-1127, 2018
39. **MW Kim**, K Kim, TY Ohm, BN Joshi, E Samuel, MT Swihart, SK Choi, HW Park, SS Yoon, Electrospayed BiVO₄ Nanopillars Coated with Atomic-Layer-Deposited ZnO/TiO₂ as Highly Efficient Photoanodes for Solar Water Splitting, *ACS Applied Materials & Interfaces*, 333, 721-729, 2018
40. TG Kim, JG Lee, CW Park, HS Jo, **MW Kim**, MV Hest, DH Cho, YD Jeong, 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*, 739, 653-659, 2018

41. JG Lee, TG Kim, S An, **MW Kim**, HS Jo, MT Swihart, AL Yarin, SS Yoon, Self-cleaning anticondensing glass via supersonic spraying of silver nanowires, silica, and polystyrene nanoparticles, *ACS Applied Materials & Interfaces*, 9 (40), 35325–35332, 2017
42. **MW Kim**, K Kim, TY Ohm, BN Joshi, E Samuel, H. Yoon, HW Park, SS Yoon, Mo-doped BiVO₄ Nanotextured Pillars as Highly Efficient Photoanodes for Solar Water Splitting, *Journal of Alloys and Compounds*, 726, 1138-1146, 2017
43. SP An, BN Joshi, JG Lee, MW Lee, YI Kim, **MW Kim**, HS Jo, SS Yoon, A comprehensive review on wettability, desalination, and purification of graphene at water interfaces, *Catalysis Today*, 295, 14-25, 2017.
44. S An, HS Jo, YI Kim, KY Song, **MW Kim**, KB Lee, AL Yarin, SS Yoon, Bio-inspired colorful, flexible, defrostable light-scattering hybrid films for effective distribution of LED light, *Nanoscale*, 9, 9139-9147. 2017.
45. HS Jo[†], **MW Kim**[†], K Kim, S An, YI Kim, SC James, J Choi, SS Yoon, Effects of Capillarity on Pool Boiling Using Nanotextured Surfaces through Electrospayed BiVO₄ Nanopillars, *Chemical Engineering Science*, 171, 360-367, 2017.
46. SP An, YI Kim, S Sinha-Ray, **MW Kim**, HS Jo, AL Yarin, SS Yoon*, Facile processes for producing robust, transparent, conductive platinum nanofiber mats, *Nanoscale*, 9, 6076-6084, 2017
47. **MW Kim**, BN Joshi, HS Jo, TY Ohm, K Kim, SS Yoon*, Electrospayed copper hexaoxodivanadate (CuV₂O₆) and pyrovanadate (Cu₂V₂O₇) photoanodes for efficient solar water splitting, *Journal of Alloys and Compounds*, 708, 444-450, 2017
48. HS Jo, SP An, HG Park, **MW Kim**, SS Al-Deyab, SC James, J Choi, SS Yoon *, Enhancement of critical heat flux and superheat through controlled wettability of cuprous-oxide fractal-like nanotextured surfaces in pool boiling, *International Journal of Heat and Mass Transfer*, 107, 105-111, 2017.
49. **MW Kim**, H Yoon, TY Ohm, HS Jo, S An, SK Choi, H Park, SS Al-Deyab, BK Min, MT Swihart, SS Yoon*, Nanotextured cupric oxide nanofibers coated with atomic layer deposited ZnO-TiO₂ as highly efficient photocathodes, *Applied Catalysis B: Environmental*, 201, 479-485, 2017.
50. E Samuel, JG Lee, BN 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 Compounds*, 715(25), 161-169, 2017
51. **MW Kim**, H Yoon, TY Ohm, MG Mali, SK Choi, HW Park, SS Al-Deyab, DC Lim, SJ Ahn, SS Yoon*, Platinum-decorated Cu(InGa)Se₂/CdS photocathodes: Optimization of Pt electrodeposition time and pH level, *Journal of Alloys and Compounds*, 692, 294-300, 2017
52. JG Lee, DY Kim, JH Lee, **MW Kim**, SP An, HS Jo, C Nervi, SS Al-Deyab, MT Swihart, SS Yoon, Scalable Binder-Free Supersonic Cold Spraying of Nanotex Cupric Oxide (CuO) Films as Efficient Photocathodes, *ACS Appl. Mater. Interfaces*, 8 (24), 15406–15414, 2016
53. H Yoon, H Kim, **MW Kim**, DY Kim, JG Lee, BN Joshi, SP An, HS Jo, J Choi, AL Yarin, SS Al-Deyab, SS Yoon*, Efficient heat removal via thorny devil nanofiber, silver nanowire, and graphene nanotextured surfaces, *International Journal of Heat and Mass Transfer*, 101, 198–204, 2016
54. 133. SP An, DY Kim, JG Lee, HS Jo, **MW Kim**, SS Al-Deyab, J Choi, SS Yoon*. Supersonically sprayed reduced graphene oxide film to enhance critical heat flux in pool boiling, *International Journal of Heat and Mass Transfer* 98, 124–130, 2016
55. H Yoon, MG Mali, **MW Kim**, SS Al-Deyab, SS Yoon*, Electrostatic Spray Deposition of Transparent Tungsten Oxide Thin Film Photoanodes for Solar Water Splitting, *Catalysis Today*, 260, 89-94, 2016

56. H Yoon, **MW Kim**, HY Kim, SS Al-Deyab, SC James, SJ Ahn, SS. Yoon*, Three Dimensional Web-like Fibrous CuInS₂ Films, *Applied Surface Science*, 351, 588-593, 2015
57. BN Joshi, H Yoon, HY Kim, **MW Kim**, MG Mali, SS Al-Deyab, SS Yoon*, Heterojunction photoanodes for solar water splitting using chemical-bath-deposited In₂O₃ micro-cubes and electro-sprayed Bi₂WO₆ textured nanopillars, *RSC Advances*, 5, 85323-85328, 2015
58. H Yoon, HY Kim, **MW Kim**, SS Lathe, SS Al-Deyab, SS Yoon*, A highly transparent self-cleaning superhydrophobic surface by organosilane-coated alumina particles deposited via electro-spraying, *Journal of Materials Chemistry A*, 3, 11403-11410, 2015
59. MG Mali, H Yoon, **MW Kim**, SS Al-Deyab, M Swihart, SS Yoon*, Electro-sprayed heterojunction WO₃/BiVO₄ films of nanotextured pillar structure for enhanced photoelectrochemical water splitting, *Applied Physics Letters*, 106, 151603, 2015
60. H Yoon, MG Mali, JY Choi, **MW Kim**, SK Choi, H Park, MS Swihart, SS Al-Deyab, SS Yoon*, Nano-textured pillars of electro-sprayed bismuth vanadate for efficient photoelectrochemical water splitting, *Langmuir*, 31, 3727-3737, 2015
61. H Yoon, SH Na, JY Choi, **MW Kim**, H Kim, HS An, BK Min, SJ Ahn, JH Yun, J Gwak, KH Yoon, SS Kolekar, M van Hest, SS Al-Deyab, MT Swihart, SS Yoon*, Carbon-free, Oxide-free Cu(InGa)(SSe)₂ Solar Cell with 4.63% Conversion Efficiency by Electrostatic Spray Deposition, *ACS Applied Materials & Interface*, 6, 8369-8377, 2014

Proceeding/Conference Papers

1. **Min-Woo Kim**, The pH control effect of BiVO₄ nanopillars for solar water splitting, **International Congress on Natural Sciences and Engineering (ICNSE 2019)**, Fukuoka, Japan, February 25-27, 2019(poster)
2. **Min-woo Kim** and Sam S. Yoon, Efficient heat removal via thorny devil nanofiber, silver nanowire, and graphene nanotextured surfaces, **International Conference on Computational Heat, Mass and Momentum Transfer (ICCHM²T 2017)**, Seoul, Korea, May 28-June 1, 2017(poster)
3. **Min Woo Kim**, Karam Kim, Barrier effect of polymeric and metalized nanofiber for embolization, **The IRES INTERNATIONAL CONFERENCE**, Tokyo, Japan, 6 November, 2017(poster)
4. Tae Yoon Ohm, Karam Kim, and **Min-woo Kim**, The Fabrication and performance of electrostatically sprayed bismuth vanadate films coated zinc oxide and titanium dioxide layer, **Global Photovoltaic Conference 2017(GPVC 2017)**, Gwangju, Korea. Mar. 15-17, 2017(poster)
5. **Min-woo Kim**, Hyun Yoon, Sam S. Yoon, Thorny devil nanotextured cupric oxide nanofibers as highly efficient photocathodes, **Global Photovoltaic Conference 2017(GPVC 2016)**, Daegu, Korea. April 6-8, 2016(poster)
6. Hyun Yoon, Seongpil An, **Min Woo Kim**, Ha-yong Kim, and Sam S. Yoon*, Optical and electrical properties of electrospun CIS nanofibers of 3D network, **The 6th World Conference on Photovoltaic Energy Conversion(WCPEC-6)**, Kyoto, Japan, Nov. 23-27, 2014(poster)
7. Hyun Yoon, Jae-Young Choi, **Min Woo Kim**, Ha Yong Kim, SeJin Ahn, Jae Ho Yun, Jihye Gwak, KyungHoon Yoon, Sam S. Yoon*, CuInS₂ nanofibers of 3D Nanostructure by electrospinning for

efficient thin film solar cell via enhanced light diffusion, charge separation and transfer, **Korea Photovoltaic Society(KPVS 2014)**, Daegu, Korea April 2-3, 2014(poster)

Award

- 2018 기계공학부 대학원 최우수 대학원생
Mechanical Engineering, Korea University, Seoul, Korea
-

FUND GRANTS

Green School(Graduate School of Energy and Environment) 2014.3-2016.2

REFERENCE

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