

# YONG IL KIM

## DOCTOR COURSE



### *Solar Cell & Aerosol Science Laboratory*

School of Mechanical Engineering

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## RESEARCH INTERESTS

- Electrohydrodynamics (electrospinning/electrospray applications)
- Nanofibers (polymer, metal, and ceramic)
- Membrane (water/oil separation, water purification, and biocompatible anti-fungal membrane)
- Photocatalysis applications (water purification, water splitting, and anti-microbial activity)
- Heat transfer applications (air cooling layer, pool boiling, and transparent heater film)
- Self-healing composites
- Metal-organic frameworks (MOFs)
- Transparent conductive electrodes (TCEs)
- Supersonic gas flow
- Secondary batteries (Li-ion battery, supercapacitor)

## EDUCATION

- Master course in Mechanical Engineering, (4.05/4.5)  
Korea University, Seoul, Korea  
Advisor: Prof. Sam S. Yoon
- Bachelor of Science in Mechanical Engineering, Aug. 2015 (3.00/4.5)  
Korea University, Seoul, Korea  
Advisor: Prof. Sam S. Yoon  
Senior Dissertation: Experimental study of nano-textured Cu<sub>2</sub>O nanofiber film for efficient air cooling

## EMPLOYMENT

- 2016/Sep. 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, Fluid mechanics II.
- 2017/Sep. to 2017/Dec.: Teaching Assistant, School of Mechanical Engineering, Korea University, Fluid mechanics II.

## PUBLICATIONS (†equal contribution, \*corresponding author)

### International Journal Papers (15 published, 8 submitted)

1. B. Joshi, E. Samuel, YI Kim, MW Kim, HS Jo, MT Swihart, WY Yoon, SS Yoon\*, Hierarchically designed ZIF-8-derived Ni@ZnO/carbon nanofiber freestanding composite for stable Li storage, Chemical Engineering Journal (IF=6.216), **submitted**.
2. E. Samuel, B. Joshi, MW Kim, YI Kim, S Park, TG Kim, WY Yoon, SS Yoon\*, ZIF8-derived ZnO/carbon nanofiber as freestanding electrodes for lithium storage in Li-ion batteries, Journal of Power Sources (IF=6.395), **submitted**.
3. BH Bang, MW Kim, YI Kim, SS Yoon\*, Growth rate and oscillation frequency of electrified jet and droplet: Effects of charge and electric field, Applied Mathematical Modelling (IF=2.35), **submitted**.
4. MW Kim†, B. Joshi, E. Samuel, K Kim, YI Kim, TG Kim, SS Yoon\*, Highly Nanotextured  $\beta$ -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), **submitted**.
5. B. Joshi†, E. Samuel†, TG Kim, CW Park, YI Kim, MT 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=3.133), **submitted**.
6. 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), **submitted**.
7. JH Hong†, S An†, KY Song, YI Kim, AL Yarin\*, JJ Kim\*, SS Yoon\*, A new approach to prevention of sapstain in wood using electrospun lignin nanofiber film, Journal of Wood Chemistry and Technology (IF=1.549), **submitted**.
8. S An, YI Kim†, HS Jo, MW Kim, MT Swihart, AL Yarin\*, SS Yoon\*, Oxidation-Resistant Transparent Conducting Films and Heaters, Acta Materialia (IF=5.301), **submitted**.
9. MW Lee, S An, YI Kim, SS Yoon\*, AL, Yarin\*, Self-healing three-dimensional bulk materials based on core-shell nanofibers, Chemical Engineering Journal (IF=6.216), 334, 1093-1100, 2018.
10. HS Jo†, S An†, XH Nguyen, YI Kim, SC James, J Choi\*, SS Yoon\*, Modifying capillary pressure and boiling regime of micro-porous wicks textured with graphene oxide, Applied Thermal Engineering (IF=3.043), 128, 1605-1610, 2018.
11. S An, YI Kim, JY Yoon, AL Yarin\*, SS Yoon\*, Wetting of Inclined Nano-textured Surfaces by Self-healing Agents, Applied Physics Letters (IF=3.411), 111, 234101, 2017
12. EP Samuel†, BN Joshi†, HS Jo, YI Kim, MT Swihart, JM Yun, KH Kim\*, SS Yoon\*,

- Flexible and freestanding core-shell SnO<sub>x</sub>/carbon nanofiber mats for high-performance supercapacitors, *Journal of Alloys and Compounds* (IF=3.133), 728, 1362-1371, 2017.
13. S An, **YI Kim**, HS Jo, MW Kim, MW LEE, AL Yarin, SS Yoon, Silver-decorated and palladium-coated copper-electroplated fibers derived from electrospun polymer nanofibers, *Chemical Engineering Journal* (IF=6.216), 327, 336-342, 2017.
  14. BN Joshi<sup>†</sup>, EP Samuel<sup>†</sup>, HS Jo, **YI Kim**, S Park, MT Swihart, WY Yoon\*, SS Yoon\*, Carbon Nanofibers Loaded with Carbon Nanotubes and Iron Oxide as Flexible Freestanding Lithium-Ion Battery Anodes, *Electrochimica Acta* (IF=4.798), 253, 179-488, 2017.
  15. S An<sup>†</sup>, **YI Kim**<sup>†</sup>, S Sinha-Ray<sup>†</sup>, MW Kim, HS Jo, MT Swihart, AL Yarin\*, SS Yoon\*, Facile processes for producing robust, transparent, conductive platinum nanofiber mats, *Nanoscale* (IF=7.367), 9, 6076-6084, 2017.
  16. S An, **YI Kim**<sup>†</sup>, MW Lee, AL Yarin\*, SS Yoon\*, Wetting coalescence of drops of self-healing agents on electrospun nanofiber mats, *Langmuir* (IF=3.833), 33(40), 10663-10672, 2017
  17. EP Samuel<sup>†</sup>, HS Jo<sup>†</sup>, BH Joshi, HG Park, **YI Kim**, S An, MT Swihart, JM Yun, KH Kim\*, SS Yoon\*, High-performance supercapacitors using flexible and freestanding MnO<sub>x</sub>/carbamide carbon nanofibers, *Applied Surface Science* (IF=3.150), 423, 210-218, 2017.
  18. EP Samuel<sup>†</sup>, BH Joshi<sup>†</sup>, HS Jo, **YI Kim**, S An, MT Swihart, JM Yun, KH Kim\*, SS Yoon\*, Carbon nanofibers decorated with FeO<sub>x</sub> nanoparticles as a flexible electrode material for symmetric supercapacitors, *Chemical Engineering Journal* (IF=6.216), 328, 776-784, 2017.
  19. 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* (IF=7.760), 9, 9139-9147, 2017.
  20. HS Jo<sup>†</sup>, MW Kim<sup>†</sup>, K Kim, S An, **YI Kim**, SC James, J Choi\*, SS Yoon\*, Effects of Capillarity on Pool Boiling Using Nanotextured Surfaces through Electrospayed BiVO<sub>4</sub> Nanopillars, *Chemical Engineering Science* (IF=2.750), 171, 360-367, 2017.
  21. S An<sup>†</sup>, BN Joshi<sup>†</sup>, JG Lee<sup>†</sup>, 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* (IF=4.312), 295, 14-25, 2017.
  22. EP Samuel<sup>†</sup>, HS Jo<sup>†</sup>, BN Joshi, S An, HG Park, **YI Kim**, WY Yoon\*, SS Yoon\*, Decoration of MnO nanocrystals on flexible freestanding carbon nanofibers for lithium ion battery anodes, *Electrochimica Acta* (IF=4.803), 231, 582-589, 2017.
  23. BN Joshi<sup>†</sup>, S An<sup>†</sup>, **YI Kim**, EP Samuel, KY Song, IW Seong, SS Al-Deyab, MT Swihart, WY Yoon\*, SS Yoon\*, Flexible freestanding Fe<sub>2</sub>O<sub>3</sub>-SnO<sub>x</sub>-carbon nanofiber composites for Li ion battery anodes, *Journal of Alloys and Compounds* (IF=3.014), 700, 259-266, 2017.

### Conference Papers

1. **YI Kim**, Antioxidant metal microfibers for use as transparent electrodes and heaters,

**International Conference on Mechanical & Production Engineering (ICMPE)**, Tokyo, Japan, Nov. 4-6, 2017

2. **YI Kim**, S An, HS Jo, SS Yoon\*, Novel platinum nanofibers via electrospinning and electroplating techniques, **Global Photovoltaic Conference (GPVC)**, Gwangju, Republic of Korea, Mar. 15-17, 2017.
3. **YI Kim**, HG Park, HS Jo, S An\*, Novel core-shell copper-silver microfibers based on electrospun polymer nanofibers, **International Conference on Mechanical Design and Engineering (ICMDE)**, Hong Kong, Jan. 20-22, 2017.

#### **Patents (1 applied, 1 registered)**

1. SG Yoon, S An, HS Jo, **YI Kim**, *Light-scattering plate for LED light and method of manufacturing the same*, 10-2017-0017971 (applied).

#### **SKILLS**

- **Technique:** SEM (scanning electron microscopy), EDX (energy dispersive x-ray spectroscopy), TEM (transmission electron microscopy), AFM (atomic force microscopy), XRD (X-ray diffraction), XPS (X-ray photoelectron spectroscopy), FTIR (Fourier transform infrared spectroscopy), Raman spectroscopy, UV-VIS spectrometer, DSC (Differential scanning calorimetry), TGA (thermogravimetric analysis), 4-point probe station, Optical surface profiler, Fluidic properties (viscosity, electrical conductivity, surface tension, dielectric constant)
- **Device fabrication:** electrospinning/electrospray device, electroplating device, supersonic flow nozzle, water contact angle measurement device
- **Design software program:** SOLIDWORKS, CATIA, PRO ENGINEERING, AUTO CAD

#### **REFERENCE**

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