

Seongpil An

Ph.D. Candidate



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RESEARCH INTERESTS

- Electrohydrodynamics (electrospinning/electrospray applications)
- 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
- Li-ion battery (Anode materials)

EDUCATION

- Doctor of Philosophy in Mechanical Engineering, Candidate (4.22/4.5)
Korea University, Seoul, Korea
Advisor: Prof. Sam S. Yoon
- Bachelor of Science in Mechanical Engineering, Feb. 2012 (3.45/4.5)
Korea University, Seoul, Korea
Advisor: Prof. Yong-Chan Kim
Senior Dissertation: Experimental study on the dynamic characteristics of a hybrid ground source heat pump with heat build-up.

EMPLOYMENT

- 2014/Sep. to 2014/Dec.: Teaching Assistant, School of Mechanical Engineering, Korea University, Dissertation guide for undergraduate.
- 2012/Jan. to 2014/June: Teaching Assistant, School of Mechanical Engineering, Korea University, Thermodynamics.
- 2011/Sep. to 2011/Dec.: Teaching Assistant, School of Mechanical Engineering, Korea University, Air conditioning.

AWARD

- Scholarship for The Encouragements of Research, College of Engineering, Korea University, 2015.
- KAIST Jo Jeong-Hoon Scholarship, Korea Advanced Institute of Science and Technology

- (KAIST), 2013.
- Best Poster Presentation Award, “Electrohydrodynamic Inkjet printing and Electrospinning Technology in Solar Cell Applications”, The Global Photovoltaic Conference (GPVC), 2012.
 - Outstanding Graduate Student Award, School of Mechanical Engineering, Korea University, 2012.
 - Outstanding Undergraduate Student Scholarship, School of Mechanical Engineering, Korea University, 2010-Spring, 2011-Fall.

PUBLICATIONS (*corresponding author, †equal contribution)

International Journal Papers

1. HS Jo[†], **S An**[†], HG Park, SS Al-Deyab, AL Yarin*, SS Yoon*, Highly flexible, stretchable, patternable, transparent copper fiber heater on a complex 3D surface, *NPG Asia Materials* (IF=6.008), submitted.
2. MW Kim[†], H Yoon[†], TY Ohm, **S An**, HS Jo, SK Choi, H Park, SS Al-Deyab, MT Swihart, SS Yoon*, Nanotextured cupric oxide nanofibers as highly efficient photocathodes, *Nanoscale* (IF=7.760), Submitted.
3. **S An**[†], JH Hong[†], KY Song, MW Lee, SS Al-Deyab, JJ Kim, AL Yarin*, SS Yoon*, Prevention of mold invasion by biocompatible lignin/polycaprolactone nanofiber membranes for amelioration of public hygiene, *Cellulose* (IF=3.195), Submitted.
4. JG Lee[†], DY Kim[†], JH Lee, MW Kim, **S An**, HS Jo, C Nervi, SS Al-Deyab, MT Swihart, SS Yoon*, Scalable binder-free supersonic cold spraying of nanotextured cupric oxide (CuO) films as efficient photocathodes, *ACS Applied Materials & Interfaces* (IF=7.145), 8, 15406-15414, 2016.
5. **S An**[†], HS Jo[†], DY Kim HJ Lee, BK Ju, SS Al-Deyab, JH Ahn, Y Qin, MT Swihart, AL Yarin*, SS Yoon*, Self-junctioned copper nanofiber transparent flexible conducting film via electrospinning and electroplating, *Advanced Materials* (IF=18.960), DOI: 10.1002/adma.201506364.
6. H Yoon[†], MW Kim[†], H Kim[†], DY Kim, **S An**, JG Lee, BN Joshi, HS Jo, J Choi, SS Al-Deyab, AL Yarin*, SS Yoon*, Efficient heat removal via thorny devil nanofiber, silver nanowire, and graphene nanotextured surfaces, *International Journal of Heat and Mass Transfer* (IF=2.857), 101, 198-204, 2016
7. **S An**[†], JS Lee[†], BN Joshi, HS Jo, K Titov, JS Chang, CH Jun, SS Al-Deyab, YK Hwang*, JC Tan*, SS Yoon*, Freestanding fiber mats of zeolitic imidazolate framework⁷ via one-step, scalable electrospinning, *Journal of Applied Polymer Science* (IF=1.866), 133, 43788, 2016.
8. BN Joshi[†], **S An**[†], HS Jo, KY Song, HG Park, S Hwang, WY Yoon, SS Al-Deyab, SS Yoon*, Flexible, Freestanding, and Binder-free SnO_x-ZnO/Carbon Nanofiber Composites for Lithium Ion Battery Anodes, *ACS Applied Materials & Interfaces* (IF=7.145), 8, 9446-9453, 2016.
9. **S 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* (IF=2.857), 98, 124-130, 2016.
10. **S An**[†], HS Jo[†], SS Al-Deyab, AL Yarin*, SS Yoon*, Nano-textured copper oxide nanofibers for efficient air cooling, *Journal of Applied Physics* (IF=2.101), 119, 065306, 2016.
11. **S An**[†], MW Lee[†], HS Jo, SS Al-Deyab, SS Yoon*, Weaving nanofibers by altering counter-

- electrode electrostatic signals, *Journal of Aerosol Science* (IF=2.278), 95, 67, 2016.
12. MW Lee[†], **S An**[†], KY Song, BN Joshi, HS Jo, SS Al-Deyab, SS Yoon*, AL Yarin*, Polyacrylonitrile nanofibers with added zeolitic imidazolate frameworks (ZIF-7) to enhance mechanical and thermal stability, *Journal of Applied Physics* (IF=2.101), 118, 245307, 2015.
 13. **S An**, HS Jo, KY Song, MG Mali, SS Al-Deyab, SS Yoon*, Electrically-charged recyclable graphene flakes entangled with electrospun nanofibers for the adsorption of organics for water purification, *Nanoscale* (IF=7.760), 7, 19170-19177, 2015.
 14. **S An**[†], M Liou[†], KY Song, HS Jo, MW Lee, SS Al-Deyab, AL Yarin*, SS Yoon*, Highly flexible transparent self-healing composite based on electrospun core-shell nanofibers produced by coaxial electrospinning for anti-corrosion and electrical insulation, *Nanoscale* (IF=7.760), 7, 17778-17785, 2015.
 15. MW Lee, **S An**, HS Jo, SS Yoon*, AL Yarin*, Self-healing nanofiber-reinforced polymer composites: 2. Delamination/debonding, and adhesive and cohesive properties, *ACS Applied Materials & Interfaces* (IF=7.145), 7, 19555-19561, 2015.
 16. MW Lee, **S An**, HS Jo, SS Yoon*, AL Yarin*, Self-healing nanofiber-reinforced polymer composites: 1. Tensile Testing and Recovery of Mechanical Properties, *ACS Applied Materials & Interfaces* (IF=7.145), 7, 19546-19554, 2015.
 17. S Liu*, X Liu, SS Lathe, L Gao, **S An**, SS Yoon, Self-cleaning transparent Superhydrophobic coatings through simple sol-gel processing of fluoroalkylsilane, *Applied Surface Science* (IF=3.150), 351, 897-903, 2015.
 18. HJ Lee, **S An**, JH Hwang, SG Jung, HS Jo, KN Kim, YS Shim, CH Park, SS Yoon, YW Park, BK Ju*, Novel composite layer based on electrospun polymer nanofibers for efficient light scattering, *ACS Applied Materials & Interfaces* (IF=7.145), 7, 68-74, 2015.
 19. MG Mali[†], **S An**[†], M Liou, SS Al-Deyab, SS Yoon*, Photoelectrochemical solar water splitting using electrospun TiO₂ nanofibers, *Applied Surface Science* (IF=3.150), 328, 109-114, 2015.
 20. **S An**[†], MW Lee[†], NY Kim, C Lee, SS Al-Deyab, SC James, SS Yoon*, Effect of viscosity, electrical conductivity, and surface tension on direct current-pulsed drop-on-demand electrohydrodynamic printing frequency, *Applied Physics Letters* (IF=3.142), 105, 214102, 2014.
 21. **S An**, C Lee, M Liou, HS Jo, JJ Park, AL Yarin*, SS Yoon*, Supersonically blown ultrathin thorny devil nanofibers for efficient air cooling, *ACS Applied Materials & Interfaces* (IF=7.145), 6, 13657-13666, 2014.
 22. MG Mali[†], H Yoon[†], **S An**, JY Choi, HY Kim, BC Lee, BN Kim, JH Park, SS Al-Deyab, SS Yoon*, Enhanced solar water splitting of electron beam irradiated titania photoanode by electrostatic spray deposition, *Applied Surface Science* (IF=3.150), 319, 205-210, 2014.
 23. MW Lee[†], **S An**[†], C Lee, M Liou, AL Yarin*, SS Yoon*, Hybrid self-healing matrix using core-shell nanofibers and capsuleless microdroplets, *ACS Applied Materials & Interfaces* (IF=7.145), 6, 10461-10469, 2014.
 24. MW Lee[†], **S An**[†], C Lee, M Liou, AL Yarin*, SS Yoon*, Self-healing transparent core-shell nanofiber coatings for anti-corrosive protection, *Journal of Materials Chemistry A* (IF=8.262), 2, 7045, 2014.
 25. **S An**[†], BN Joshi[†], NY Kim, SS Yoon*, Electrospun graphene-ZnO nanofiber mats for photocatalysis applications, *Applied Surface Science* (IF=3.150), 294, 24-28, 2014.
 26. **S An**[†], MW Lee[†], BN Joshi, A Jo, J Jung, SS Yoon*, Water purification and toxicity control of

- chlorophenols by 3D nanofiber membranes decorated with photocatalytic titania nanoparticles, *Ceramics International* (IF=2.758), 40, 3305-3313, 2014.
27. MW Lee[†], **S An**[†], SS Latthe, C Lee, S Hong, SS Yoon*, Electrospun polystyrene nanofiber membrane with superhydrophobicity and superoleophilicity for selective separation of water and low viscous oil, *ACS Applied Materials & Interfaces* (IF=7.145), 5, 10597-10604, 2013.
 28. SS Latthe[†], **S An**[†], S Jin, SS Yoon*, High energy electron beam irradiated TiO₂ photoanodes for improved water splitting, *Journal of Materials Chemistry A* (IF=8.262), 1, 13567, 2013.
 29. S Sinha-Ray[†], MW Lee[†], S Singho-Roy, **S An**, B Pourdeyhimi, SS Yoon*, AL Yarin*, "Supersonic nanoblowing: A new ultra-stiff phase of nylon 6 in 20-50 nm confinement", *Journal of Materials Chemistry C* (IF=5.066), 1, 3491-3498, 2013.
 30. MW Lee, **S An**, BN Joshi, SS Yoon*, Highly efficient wettability control via 3D suspension of titania nanoparticles to polystyrene nanofibers, *ACS Applied Materials & Interfaces* (IF=7.145), 5, 1232-1239, 2013.
 31. Y Zhang[†], MW Lee[†], **S An**, S Sinha-Ray, S Khansari, BN Joshi, S Hong, JH Hong, JJ Kim, SS Yoon*, AL Yarin*, B Pourdeyhimi, Antibacterial activity of electrospun titania nanofiber mats and solution-blown soy protein nanofiber mats decorated with silver nanoparticles, *Catalysis communications* (IF=3.389), 34, 35-40, 2013.
 32. MW Lee, **S An**, NY Kim, JY Huh, HY Kim, SS Yoon*, Effects of pulsing frequency on characteristics of electrohydrodynamic inkjet using micro-Al and nano-Ag particles, *Experimental Thermal and Fluid Science* (IF=2.128), 46, 103-110, 2013.

Patents

1. AL Yarin, SG Yoon, **S An**, Apparatus for manufacturing polymer nanofiber-embedded embolic coil and method for controlling the same, 10-2016-60404.
2. SG Yoon, **S An**, HS Jo, JS Chang, YK Hwang, JS Lee, Apparatus for manufacturing the gas adsorption membrane possessed of structure of textile using ZIF-7 and method for controlling the same, 10-2016-0024660.
3. SG Yoon, MW Lee, **S An**, C Lee, Self-healing composite material, apparatus and method for manufacturing the same, 10-2015-134098.
4. SG Yoon, **S An**, Graphene filter was manufactured by the manufacturing method and applies graphene and graphene filter water purifier filter, 10-2015-0105335.
5. **S An**, SG Yoon, Method for manufacturing transparent conductive film and apparatus for the same, 10-2015-44011, PCT/KR2016/003218.
6. **S An**, AL Yarin, SG Yoon, Apparatus for producing nano-texture film, 10-1603011, PCT/KR2014/009691.
7. MW Lee, **S An**, Jung Jae Park, Suk Goo Yoon, Coating Apparatus of Anti-bacterial Coating Layer Using Electrospinning and Electrostatic Spray Depositioning Method, 10-1375996.
8. SG Yoon, **S An**, MW Lee, Hybrid Coating Apparatus Using Electrospinning and Electrostatic Spray Depositioning Method, 10-1357483.

Proceeding/Conference Papers

1. SS Yoon*, AL Yarin, MW Lee, **S An**, Self-healing transparent core-shell nanofiber coatings for anti-corrosive protection, *Electrospin 2016*, Otranto, Italy, Jun. 28-Jul. 1, 2016.
2. **S An**, Biocompatible electrospun nanofiber membranes for prevention of fungal invasion, *The Second UIC-KU Conference on Nano-textured Composite*, Chicago, USA, Apr. 20-May 1, 2016.
3. HS Jo, **S An***, KY Song, HG Park, Efficient air cooling using optimized nano-textured surface

- comprised of copper oxide nanofibers, 5th Annual International Conference on Sustainable Energy and Environmental Sciences, Singapore, Feb. 22-23, 2016.
4. **S An**, SS Yoon*, Self-junctioned copper nanofibers for transparent conducting electrodes via electrospinning and electroplating, The 5th East Asia Mechanical and Aerospace Engineering Workshop, Seoul, Korea, May 28-30, 2015.
 5. **S An**, Self-junctioned Cu-plated wires for transparent conducting electrodes using electrospinning and electroplating, The First UIC-KU Conference on Nano-textured Composite, Chicago, USA, Apr. 16-24, 2015.
 6. H Yoon, JG Lee, **S An**, JY Choi, YH Cha, C Lee, SS Yoon*, Enhanced photodegradation performance of Nb doped ZnO thin films prepared by electrostatic spray deposition, Electrochemical Conference on Energy & the Environment (ECEE), Shanghai, P.R. China, Mar. 13-16, 2014.
 7. HJ Lee, MW Lee, YW Park, **S An**, YY Yu, KB Choi, SS Yoon*, BK Ju*, The effect of composite nanofiber layer base on polyacrylonitrile with SU-8 for light out coupling enhancement, Solid state Surfaces and Interfaces 2013, Smolenice Castle, Slovakia, Nov. 25-28, 2013.
 8. H Yoon, JY Choi, **S An**, SJ Ahn, JH Yun, J Gwak, KH Yoon, SS Yoon*, Copper-indium nanofibers nanotextured by electroplating, Global Photovoltaic Conference (GPVC), Busan, Korea, Nov. 23-26, 2013.
 9. MW Lee, S Latthe, **S An**, SS Yoon*, Electrospun Graphene-ZnO Nanofibers for Water Splitting Application, KSME Spring Meeting, Fluid Mechanics Division, Jeju, Korea, May 9-10, 2013.
 10. NY Kim, MW Lee, **S An**, SS Yoon*, Electrohydrodynamic inkjet printing and electrospinning technology in solar cell applications, Global Photovoltaic Conference (GPVC), Busan, Korea, Aug. 27-29, 2012.

RESEARCH PROJECTS

1. 뇌동맥류 코일 색전술용 극미세 백금나노섬유 제조, 고려대학교, 2016. 08. 01 – 2017. 07. 31.
2. 뇌동맥류 코일 색전술용 백금나노섬유 제조 기술 및 딜리버리 카테터 개발: 극미세 생체적합성 나노섬유 기반 직경 200 nm 급 뇌동맥류 백금 코일, 중소기업청, 2016. 07 – 2017. 06. 30.
3. 50 nm 이하 3D 나노텍스처 방열필름을 이용하여 0.1 kW/cm² 이상의 냉각률을 갖는 LED 조명 개발, 중소기업청, 2015. 10. 01 – 2017. 09. 30.
4. 친환경 리그닌 나노섬유를 이용한 목재 변색균 방제에 관한 연구: 직경 100 nm 급 리그닌 나노섬유 및 접착성/생분해성 다공성 리그닌 멤브레인 개발, 고려대학교 생명과학대학, 2015. 05. 01 – 2016. 04. 30.
5. 극미세 금속나노섬유 기반 3D 나노텍스처 방열필름 및 자가접합 플렉서블 투명전극 개발, 미래창조과학부, 2015. 04. 27 – 2017. 04. 26.
6. 비진공 상온 스프레이 코팅 공정을 이용한 유연 투명전극 개발, 고려대학교 기술지주회사, 2015. 03. 16 – 2015. 05. 15.
7. 민군용 구조물 및 장비의 미세균열 방지를 위한 생체모방 초미세/초경량/고투과도 자가치유 나노 기술, 국방과학연구소, 2014. 12. 19 – 2017. 10. 05.
8. 기계/항공/건설 복합재료용 자가복원 코어-셸 구조의 나노섬유 기초연구, 고려대학교,

2014. 07. 01 – 2017. 06. 30.

9. 전자빔을 이용한 수소생산 및 수처리용 하이브리드 광촉매 나노소재 개발, 미래창조과학부, 2014. 06. 01 – 2015. 05. 31.
10. 전기수력학(EHD) 잉크젯 프린팅기술을 이용한 태양전지 및 전자부품 박막 패터닝, 미래창조과학부, 2013. 05. 01 – 2016. 04. 30.
11. 밤에도 작동 가능한 미생물 태양전지, 교육과학기술부, 2011. 11. 18 – 2014. 10. 31.
12. 전자빔을 이용한 초강도 3차원 거미실크 유변공정 모사, 교육과학기술부, 2012. 06. 12 – 2014. 05. 31.

CERTIFICATES

1. The 2012 New Radiation Worker Training, Korea Radioisotope Association, No. 2012-N1446, Sep, 2012.
2. The 2nd Technical Education of Silicon Solar Cell, The Human Resources Development of the Korea Institute of Energy Technology Evaluation and Planning (KETEP), No. KU-SERC-12-060, Feb, 2012.

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
- **Computational fluid dynamics code:** FLUENT
- **Design software program:** CATIA, Pro Engineering, AUTO CAD

REFERENCE

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