

JONGHYUKLEE

MASTER COURSE



Solar Cell & Aerosol Science Laboratory

School of Mechanical Engineering

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RESEARCH INTERESTS

- **Solar cell** : Silicon Solar cell(I-Gen.), Thin film Solar cell(II-Gen.), Dye-Sensitized Solar cell(III-Gen.)
- **Photocatalysis applications** : Antibacterial activity, Water purification, Self-cleaning
- **Thin film coating process** : Cold Gas Dynamic Spray (CGDS) & Aerosol Deposition (AD)
- **Materials research** : Graphene(TCO, Heat sink), Lithium ion battery(Anode), Ceramic(TiO₂), Metal(Copper)

EDUCATION

- Master course in Mechanical Engineering, (4.38/4.5)
Korea University, Seoul, Korea
Advisor: Prof. Sam S. Yoon
- Bachelor of Mechanical Engineering, Aug. 2014 (3.06/4.5)
Korea University, Seoul, Korea

EMPLOYMENT

- 2016/Mar. to 2016/Jun.: Teaching Assistant, School of Mechanical Engineering, **Korea University**, Thermodynamics.
- 2015/Aug. to 2015/Nov: Teaching Assistant, School of Mechanical Engineering, **Korea University**, Applied Fluid Mechanics.

PUBLICATIONS

1. **JG Lee**, DY Kim, JH Lee, HG Park, SS. Al-Deyab, HW Lee, JS Kim, DH Yang, A Yarin, SS Yoon*, "Supersonically Sprayed Copper-Nickel Microparticles as Flexible and Printable Thin-Film High Temperature Heaters", ***Advanced Materials Interfaces (IF=3.365)***, Accepted, **2017**
2. JJ Park[†], JG Lee[†], DY Kim, **JH Lee**, JH Yoon, J Gwak, YJ Eo, A Cho, M Swihart, SS. Al-Deyab, SJ Ahn, DH Kim, SS. Yoon*, "Rapid supersonic spraying of Cu(In,Ga)(S,Se)₂ nanoparticles to fabricate a solar cell with 5.49 % conversion efficiency", ***Acta Materialia***, 123, 44-54, **2017**
3. **G 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=8.262), 5, 6677-6685, 2017
4. B Joshi[†], **JG Lee**[†], DY Kim, JH Lee, JS Lee, YK Hwang, JS Chang, SS Al-Deyab, JC Tan*, SS Yoon*. “Tuning Crystalline Structure of Zeolitic Metal–Organic Frameworks by Supersonic Spraying of Nanoparticle Suspensions”, *Materials & Design* (IF=3.997), 114(15), 416-423, 2016
 5. JG Lee, B Joshi, **JH Lee**, TG Kim, DY Kim, SS. Al-Deyab, IW Seong, M 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*, Submitted, 2016
 6. JG Lee, DY Kim, S An, **JH Lee**, S Sinha-ray, A Yarin, M Swihart, SS. Al-Deyab, SS Yoon*, “Production of flexible transparent conducting films of self-fused nanowires via one-step supersonic spraying”, *Advanced Functional Materials*, accepted, 2016
 7. JG Lee[†], **JH Lee**[†], DY Kim, JY Yoon, JW Choi, MG Kang, JI Lee, H Song, SS Al-deyab, SC James, Y Kang, D Kim, HS Lee*, “Effects of Conditions on the Electrical and Mechanical Properties of Supersonic Cold Sprayed Cu-Ni Electrodes”, *Journal of Alloy and Compounds*, Submitted, 2016
 8. 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*, Submitted, 2016
 9. JG Lee, DY Kim, B Joshi, **JH Lee**, TK Lee, JS Lee, DH Yang, SS Al-Deyab, SS Yoon*, “Electrically insulative performances of ceramic and clay films deposited via supersonic spraying”, *Journal of Thermal Spray Technology*, 2016, accepted
 10. DY Kim, B Joshi, JG Lee, **JH Lee**, JS Lee, YK Hwang, JS Chang, SS. Al-Deyab, JC Tan, SS Yoon*, “Scalable Supersonic Cold Spraying for Zeolitic Metal-Organic Framework Thin Films”, *Chemical Engineering Journal*, 295, 49-56, 2016
 11. DY Kim[†], JG Lee[†], B Joshi, **JH Lee**, SS. Al-Deyab, HG Yoon, DR Yang, A Yarin, SS Yoon*, “Supersonically sprayed thermal barrier layers using clay micro-particles”, *Applied Clay Science*, 120, 142-143, 2016
 12. JG Lee, YH Cha, DY Kim, **JH Lee**, SC James, SS. Al-Deyab, TK Lee, WY Kim, SS Yoon*, “Robust mechanical properties of electrically insulative alumina films by supersonic aerosol deposition”, *Journal of Thermal Spray Technology*, 24, 6, 1046-1051, 2015

PRESENTATIONS

1. **Jong-Hyuk Lee**, Jong-Gun Lee, Do-Yeon Kim, Electrically Insulative Performances of Clay Films Deposited via Kinetic Spraying, Tokyo International Conference on Engineering and Applied Sciences, Tokyo, Japan, Aug. 14-15, 2016.
2. **Jong-Hyuk Lee**, Do-Yeon Kim, Bhavana N. Joshi, Jong-Gun Lee, Sam S. Yoon, Fabricate Zeolitic Metal-Organic Framework Films via Supersonic Cold Spraying, The 14th International Nanotech Symposium & Nano-Convergence Expo, Ilsan, Korea, July. 13-15, 2016.

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, TGA/DTG (Thermogravimetry analysis), Optical surface profiler, Fluidic properties (Viscosity, electrical conductivity, surface tension, dielectric constant)
 - Device fabrication: Aerosol deposition, Cold spray thin film deposition
 - Computational program: FLUENT, FORTRAN, CATIA
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REFERENCE

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