

Ph.D. candidate

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Solar Cell and Aerosol Science Lab.

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EDUCATION

Korea University, Seoul, Korea

Cumulative : 4.17/4.5

Ph.D. candidate of Science in Mechanical Engineering,

Advisor : Prof. Sam Sukgoo Yoon,

Korea University, Seoul, Korea

Cumulative : 3.81/4.5

Master of Science in Mechanical Engineering,

Advisor : Prof. Sam Sukgoo Yoon, 2011-2013

Chungnam National University, Daejeon, Korea

Cumulative : 3.56/4.5

Bachelor of Science in Mechanical Engineering, 2005-2011

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)

PUBLICATIONS

1. B Bang, C Ahn, DY Kim, **JG Lee**, H Kim, Y Jeong, W Yoon, SS. Al-Deyab, J Yoo, SS Yoon*, AL. Yarin*, "Breakup Process of Cylindrical Viscous Liquid Specimens after a Strong Explosion in the Core", *Physics of Fluids*, Submitted, 2016
2. **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*, Submitted, 2016
3. 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 Suspension Precursors", *Journal of Aerosol Science*, Submitted, 2016

4. 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", *Materials & Design*, Under review
5. H Yoon, M Kim, H Kim, DY Kim, S An, JG Lee, B Joshi, HS Cho, J Choi, SS Al-Deyab, A Yarin, 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
6. 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*, 8(24), 15406-15414, 2016
7. 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*, 25(4), 763-769, 2016
8. 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*, 98, 124-130, 2016
9. BJ Kang, KD Lee, JG Lee, SS Yoon, YM Kang, HS Lee, DH Kim*, "Influence of particle velocity of copper on emitter contact by cold spray method", *Journal of Thermal Spray Technology*, 25(3), 465-472, 2016
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, 142-146, 2016
12. JG Lee, DY Kim, MG Mali, SS Al-Deyab, MT Swihart, SS Yoon*, "Supersonically blown nylon-6 nanofibers entangled with graphene flakes for water purification", *Nanoscale*, 7, 19027-19035, 2015
13. JG Lee, DY Kim, B Kang, D Kim, SS Al-Deyab, S James, SS Yoon*, "Thin film metallization process by supersonic spraying copper nickel nanoparticles on a silicon substrate", *Computational Materials Science*, 108, Part A, 114-120, 2015
14. 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
15. JG Lee, DY Kim, B Kang, D Kim, HE Song, J Kim, W Jung, D Lee, SS Al-Deyab, SC James, SS Yoon*, "Nickel-copper hybrid electrodes self-adhered onto silicon wafer by supersonic cold-spray", *Acta Materialia*, 93, 156-163, 2015
16. JJ Park[†], JG Lee[†], SC James, SS Al-Deyab, SS Yoon*, "Thin-film metallization of CuInGaSe₂ nanoparticles by supersonic kinetic spraying", *Computational Materials Science*, 101, 66-76, 2014
17. DY Kim[†], JG Lee[†], BN Joshi, SS Latthe, SS Al-Deyab, SS Yoon*, "Self-cleaning superhydrophobic films by supersonic-spraying polytetrafluoroethylenetitanium nanoparticles", *Journal of Material Chemistry A*, 3, 3975-3983, 2015
18. JG Lee, DY Kim, JJ Park, YH Cha, JY Yoon, HS Jeon, BK Min, MT Swihart, SH Jin, SS Al-Deyab, SS Yoon*, "Graphene-titania hybrid photoanodes produced by supersonic kinetic aerosol deposition for solar water splitting", *Journal of the American Ceramic Society*, 97(11), 3660-3668, 2014
19. DY Kim, S Sinha-Ray, JJ Park, JG Lee, YH Cha, SH Bae, JH Ahn, YC Jung, S Kim, AL Yarin, SS Yoon*, "Self-healing reduced graphene oxide films by supersonic kinetic spraying", *Advanced Functional Materials*, 24(31), 4986-4995, 2014
20. DY Kim, BN Joshi, JJ Park, JG Lee, YH Cha, TY Seong, SI Noh, HJ Ahn, SS Yoon*, "Graphene-titania films by supersonic kinetic spraying for enhanced performance of dye-sensitized solar cells", *Ceramics international*, 40(7), Part B, 11089-11097, 2014
21. JJ Park, DY Kim, JG Lee, MT Swihart, SS Yoon*, "Supersonic Aerosol-Deposited TiO₂ Photoelectrodes for Photoelectrochemical Solar Water Splitting", *RSC Advances*, 4, 8661-8670, 2014
22. AB Gurav, SS Latthe, RS Whatkar, JG Lee, DY Kim, JJ Park, SS Yoon*, "Superhydrophobic surface decorated with vertical ZnO nanorods modified by stearic acid", *Ceramics International*, 40(5), 7151-

7160, 2013

23. JJ Park, DY Kim, SS Latthe, **JG Lee**, MT Swihart, SS Yoon*, “Thermally-Induced Superhydrophilicity in TiO₂ Films Prepared by Supersonic Aerosol Deposition”, *ACS Applied Materials & Interfaces*, 5(13), 6155-6160, 2013
24. DY Kim, JJ Park, **JG Lee**, M van Hest, SS Yoon*, “Wettability and photocatalysis of CF₄ plasma etched titania films of honeycomb structure”, *Ceramics International*, 39(8), 9737-9742, 2013
25. DY Kim, JJ Park, **JG Lee**, D Kim, SJ Tark, S Ahn, JH Yun, J Gwak, KH Yoon, S Chandra, SS Yoon, “Cold Spray Deposition of Copper Electrodes on Silicon and Glass Substrates” *Journal of Thermal Spray Technology*, 22, (7), 1092-1102, 2013
26. JJ Park, DY Kim, **JG Lee**, D Kim, JH Oh, TY Seong, M van Hest, SS Yoon *, “Superhydrophilic Transparent Titania Films by Supersonic Aerosol Deposition”, *Journal of the American Ceramic Society*, 96(5), 1596-1601, 2012
27. JJ Park, **JG Lee**, DY Kim, JH Hong, JJ Kim, S Hong, SS Yoon *, “Antibacterial and Water Purification Activities of Self-Assembled Honeycomb Structure of Aerosol Deposited Titania Film”, *Environmental Science & Technology*, 46, 12510-12518, 2012
28. DY Kim, JJ Park, **JG Lee**, MW Lee, HY Kim, JH Oh, TY Seong, D Kim, SC James, M van Hest, S Chandra, SS Yoon *, “Tuning Hydrophobicity with Honeycomb Surface Structure and Hydrophilicity with CF₄ Plasma Etching for Aerosol-Deposited Titania Films”, *Journal of the American Ceramic Society*, 95, 3955-3961, 2012

Note: (*)*, corresponding author

PRESENTATIONS

1. **JG Lee**, “Fabricate nylon-6/graphene membrane via cold spray for water purification”, 5th Annual International Conference on SEES2016, Singapore, Feb. 22-24, 2016
2. **JG Lee**, DY Kim, SS Yoon*, “Nickel-copper hybrid electrodes self-adhered onto silicon wafer by supersonic cold-spray”, ASME-JSME-KSME Joint Fluids Engineering Conference, Seoul, Korea, Jul. 26-31, 2015
3. SS Yoon*, **JG Lee**, DY Kim, “ Nickel-copper electrodes onto a silicon wafer by cold spray coating process”, *Korea Photovoltaic Society*, Busan, Korea, Apr. 29-30, 2015
4. JJ Park, **JG Lee**, DY Kim, M Liou, SS Yoon*, “Kinetically metallized carbon-free CuInGaSe₂ solar cell by supersonic spraying dry nanoparticles”, *The 6th World Conference on Photovoltaic Energy Conversion(WCPEC-6)*, Kyoto, Japan, Nov. 23-27, 2014
5. 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 2014)*, Shanghai, China, Mar. 13-16, 2014
6. JJ Park, DY Kim, **JG Lee**, YH Cha, SS Yoon*, “Tuning Hydrophobicity Using Cold Sprayed Teflon_Titania Composite Thin Films”, *Global Photovoltaic Conferences 2013 (GPVC 2013)*, Busan, Korea, Nov. 23-26, 2013
7. JJ Park, DY Kim, **JG Lee**, YH Cha, SS Yoon*, “Titania Composite Thin Films for Acute Inkjet Printing”, *Global Photovoltaic Conferences 2013 (GPVC 2013)*, Busan, Korea, Nov. 23-26, 2013
8. JJ Park, DY Kim, **JG Lee**, SS Yoon*, “Solution Precursor Graphene Coating by Cold Spray”, *KSME (The Korea Society of Mechanical Engineers)*, Jeju, Korea, May, 9-10, 2013
9. DY Kim, JJ Park, **JG Lee**, SS Yoon*, “Fabrication of CISSe Thin Film Solar Cell via Cold Spray”, *KPVC (Korea Photovoltaic Society 2013)*, Suwon, Korea, Apr, 29-30, 2013
10. **JG Lee**, JJ Park, DY Kim, Sam S. Yoon*, “Low-cost Copper-based Front Electrode Manufacture for Crystalline Silicon and CIS Solar Cells by Cold Spray”, *GPVC (Global Photovoltaic Conference 2012)*, Busan, Korea, Aug, 27-29, 2012

Note: (*)*, corresponding author

PATENT

1. SS Yoon, **JG Lee**, DY Kim, JJ Park, MW Lee, “Apparatus for manufacturing a solar cell substrate with cold spraying and method for controlling the same”, PCT-KR-2012-972, pending.

2. SS Yoon, KH Yoon, JJ Park, DY Kim, **JG Lee**, JH Gwak, JH Yun, SJ Ahn, Ara Cho, KS Shin, "Grid electrode for solar cell, fabrication method an apparatus of grid electrode", 10-2012-0124609
3. SS Yoon, DY Kim, JJ Park, MW Lee, **JG Lee**, "무기물 박막 태양전지 제조 장치 및 이의 제어방법", 10-1311107
4. SS Yoon, DY Kim, **JG Lee**, "나노텍스처 방열판 및 그 제조방법", 10-2015-0152111
5. SS Yoon, DY Kim, JJ Park, **JG Lee**, "실리콘 입자 분쇄장치", 10-2015-0105968

AWARD

1. Award for Best Graduate Student, Department of Mechanical Engineering, Korea University, 2015
2. Achievement Award, Korea University, 2015

SKILLS

Device fabrication: Aerosol deposition, Cold spray thin film deposition

Measurement techniques: Atomic force microscopy(AFM), Scanning electron microscopy(SEM), Transmission electron microscopy(TEM), X-ray diffraction(XRD), UV-vis spectrophotometer, Schlieren method, Dynamic water contact angle measurement, Fourier Transform Infrared Spectroscopy (FT-IR)

Computational simulation: Computational Fluid Dynamics (Fluent, Gambit)

Computer Proficiency: Windows 98 - Window 7, MS – Office 2003 - 2010, Origin 8

Reference

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