

HYUN YOON PH.D., RESEARCHER

KIER-UNIST Advanced Center for Energy
Korea Institute of Energy Research(KIER)
UNIST-gil50, Eonyang-eup, Ulju-gun, Ulsan, Korea, 689-851
Tel. & Fax: +82-52-217-2996 C.P.: +82-10-4494-4995
Researcher No. 1120 2689
E-mail: h.yoon@kier.re.kr, yoonyun83@gmail.com



RESEARCH INTERESTS

- **Photoelectrochemical water splitting materials:** BiVO₄, WO₃, WO₃/BiVO₄, TiO₂, Ag-ZnO, CIGS, CuO, In₂O₃, In₂O₃/Bi₂WO₆
- **Solarcell :** Heterojunction with Intrinsic Thin layer(HIT) solarcell, Nano-particle(CIGS) coating Thin film, Solution-type(CIS/CIGS) coating Thin film Solar cell(II-Gen.), CIS 3-D nanostructure
- **Graphene/CNT thin-film coating applications:** Water purification, Desalination
- **Titanium dioxide(TiO₂) thin-films coating applications:** Antibacterial activity, Water purification, Self-cleaning
- **Oil-water separation membrane(Oleophobic-Superhydrophilic application)**
- **Water purification membrane(photocatalysis)**
- **Superhydrophobic thin film application**
- Electrohydrodynamics spray coating for thin-film applications
- Electro-spinning for nano-fiber applications

EDUCATION

- **Doctor of Philosophy** in Mechanical Engineering, Feb. 2016
Korea University, Seoul, Korea
Thesis: Compound Semiconductor and Metal Oxide Thin Films for Solar Water Splitting
Advisor: Prof. Sam Sukgoo Yoon
- **Master of Science** in Mechanical Engineering, Feb. 2011
Korea University, Seoul, Korea
Thesis: Experimental Study on CIS Thin-Film Coating via Electrostatic Spray Deposition
Advisor: Prof. Sam Sukgoo Yoon
- **Bachelor of Science** in Mechanical Engineering, Feb. 2009
Kyunghee University, Kyung-gi, Korea

EMPLOYMENT

2016/Apr. to Present: RESEARCHER, KIER-UNIST Advanced Center for Energy, *Korea Institute of Energy Research*, Ulsan, Korea

PUBLICATIONS

INTERNATIONAL JOURNAL PAPERS

1. Min-woo Kim¹, **Hyun Yoon¹**, Tae Yoon Ohm, hong Seok Jo, Seongpil An, Sung Kyu Choi, Hyunwoong Park, Salem S Al-Deyab, Byoung Koun Min, Mark T Swihart, Sam S. Yoon^{*}, Nanotextured Cupric Oxide Nanofibers as Highly Efficient Photocathodes, **Applied Catalysis B: Environmental** (SCI, IF=7.435), **submitted**
2. **Hyun Yoon¹**, Min-woo Kim¹, Mukund G. Mali, Sung Kyu Choi, Hyunwoong Park, Salem S. Al-Deyab, Dong Chan Lim^{*}, SeJin Ahn^{**}, Sam S. Yoon^{***}, Platinum-electrodeposited CIGS/CdS electrodes for photoelectrochemical solar water splitting, **Electrochimica Acta**(SCI, IF=4.504), **submitted**
3. **Hyun Yoon¹**, Min-woo Kim¹, Ha-yong Kim¹, Do-Yeon Kim, Seongpil An, Jong-Gun Lee, Bhavana N. Joshi, Hong Seok Jo, Jeehoon Choi, Salem S. Al-Deyab, Alexander L. Yarin^{*}, Sam S. Yoon^{*}, Efficient heat removal via thorny devil nanofiber, silver nanowire, and graphene nanotextured surfaces, **International Journal of Heat and Mass Transfer**(SCI, IF=2.857), 101, 198-204, Oct. 2016
4. **Hyun Yoon¹**, Mukund G. Mali¹, Hayong Kim, Salem S. Al-Deyab, Sam S. Yoon^{*}, Efficient Water Purification by Photocatalysis and Rapid Adsorption of Dip-coated Metal Foam with Nanostructured Bismuth Vanadate, **Journal of the American Ceramic Society**(SCI, IF=2.787), 99(3), 1023-1030, Mar. 2016
5. Santosh S. Patil, Mukund G. Mali, Mohaseen S. Tamboli, Deepak R. Patil, Milind V. Kulkarni, **Hyun Yoon¹**, Ha-Yong Kim, Salem S. Al-Deyab, Sam S. Yoon^{*}, Sanjay S. Kolekar^{**}, Bharat B. Kale^{***}, Green Approach for Hierarchical Nanostructured Ag-ZnO and their Photocatalytic Performance under Sunlight, **Catalysis Today**(SCI, IF=4.312), 260, 126-134, Feb. 2016
6. **Hyun Yoon¹**, Mukund G. Mali¹, Min-woo Kim, Salem S. Al-Deyab, Sam S. Yoon^{*}, Electrostatic Spray Deposition of Transparent Tungsten Oxide Thin Film Photoanodes for Solar Water Splitting, **Catalysis Today** (SCI, IF=4.312), 89-94, Feb. 2016
7. Mukund G. Mali¹, **Hyun Yoon¹**, Hayong Kim, Bhavana Joshi, Salem S. Al-Deyab, Sam S. Yoon^{*}, Chemical-bath-deposited indium oxide microcubes for solar water splitting, **ChemPhysChem**(SCI, IF=3.138), 16, 3450-3457, Nov. 2015
8. **Hyun Yoon¹**, Min-woo Kim¹, Ha Yong Kim, Salem S. Al-Deyab, Scott C. James, SeJin Ahn^{*}, Sam S. Yoon^{*}, Three Dimensional Web-like Fibrous CuInS₂ Films, **Applied Surface Science**(SCI, IF=3.150), 351, 588-593, Oct. 2015
9. Bhavana Joshi¹, **Hyun Yoon¹**, Hayong Kim, Min-woo Kim, Mukund G. Mali, Salem S. Al-Deyab, Sam S. Yoon^{*}, Heterojunction photoanodes for solar water splitting using chemical-bath-deposited In₂O₃ micro-cubes and electro-sprayed Bi₂WO₆ textured nanopillars, **RSC Advances**(SCIE, IF=3.289), 5, 85323-85328, Sep. 2015
10. Mukund G. Mali¹, **Hyun Yoon¹**, Bhavana N. Joshi, Hyunwoong Park, Salem S. Al-Deyab, Dong Chan Lim^{*}, SeJin Ahn^{**}, Carlo Nervi, Sam S. Yoon^{***}, Enhanced photoelectrochemical solar water splitting using a platinum-decorated CIGS/CdS/ZnO photocathode, **ACS Applied Materials and Interfaces**(SCI,IF=7.145), 7(38), 21619-21625, Sep. 2015

11. Mukund G. Mali¹, **Hyun Yoon**¹, Min Woo Kim, Mark T. Swihart, Salem S. Al-Deyab, Sam S. Yoon*, Electrospayed heterojunction WO₃/BiVO₄ films with nanotextured pillar structure for enhanced photoelectrochemical water splitting, **Applied Physics Letters**(SCI, IF=3.142), 106(15), 151603, Apr. 2015
12. **Hyun Yoon**¹, Ha Yong Kim¹, Sanjay S. Latthe, Min Woo Kim, Salem S. Al-Deyab, Sam S. Yoon*, A Highly Transparent Self-Cleaning Superhydrophobic Surface by organosilane-coated alumina particles deposited via electrospaying, **Journal of Materials Chemistry A**(SCI, IF=8.262), 3(21), 11403-11410, Apr. 2015
13. **Hyun Yoon**¹, Mukund G. Mali¹, Jae Young Choi, Min-woo Kim, Sung Kyu Choi, Hyunwoong Park, Salem S. Al-Deyab, Mark T. Swihart, Alexander L. Yarin*, Sam S. Yoon*, Nano-textured Pillars of Electrospayed Bismuth Vanadate for Efficient Photoelectrochemical Water Splitting, **Langmuir**(SCI,IF=3.993), 31(12), 3727-3737, Mar. 2015
14. Annaso B. Gurav, Qingfeng Xu, Sanjay S. Latthe, R. S. Vhatkar, Shanhu Liu*, **Hyun Yoon**, Sam. S. Yoon*, Superhydrophobic Coatings Prepared from Methyl-modified Silica Particles using Simple Dip-coating Method, **Ceramics International**(SCI,IF=2.758), 41(2), Part B, 3017-3023, Mar. 2015
15. Mukund G. Mali¹, **Hyun Yoon**¹, Seongpil An, Jae-Young Choi, Ha Yong Kim, Byung Cheol Lee, Byung Nam Kim, Ji Hyun Park, Salem S. Al-Deyab, Sam S. Yoon*, Enhanced solar water splitting of electron beam irradiated titania photoanode by electrostatic spray deposition, **Applied Surface Science**(SCI, IF=3.150), 319, 205-210, Nov. 2014
16. **Hyun Yoon**, Seung-Heon Na, Jae-Young Choi, Sanjay S. Latthe, Mark T. Swihart, Salem S. Al-Deyab, Sam S. Yoon*, Gravity-driven hybrid membrane for oleophobic-superhydrophilic oil-water separation and water purification by graphene, **Langmuir**(SCI,IF=3.993), 30(39), 11761-11769, Sep. 2014
17. **Hyun Yoon**¹, Bhavana N. Joshi¹, Seung-Heon Na, Jae-Young Choi, Sam S. Yoon*, Photodegradation of methylene blue of niobium-doped zinc oxide thin films produced by electrostatic spray deposition, **Ceramics International**(SCI,IF=2.758), 40(5), 7567-7571, Jun. 2014
18. **Hyun Yoon**, Seung-Heon Na, Jae Young Choi, Min Woo Kim, Ha Yong Kim, Hui Sang Ahn, Byoung Koun Min, SeJin Ahn, Jae Ho Yun, Jihye Gwak, KyungHoon Yoon, Sanjay S. Kolekard, Maikel F.A.M. van Hest, Salem S. Al-Deyab, Mark T. Swihart, Sam S. Yoon*, Carbon- and Oxygen-Free Cu(InGa)(SSe)₂ Solar Cell with a 4.63% Conversion Efficiency by Electrostatic Spray Deposition, **ACS Applied Materials and Interfaces**(SCI,IF=7.145), 6(11), 8369-8377, Apr. 2014
19. Bhavana Joshi¹, **Hyun Yoon**¹, Seung-Heon Na, Jae-Young Choi, Sam S. Yoon*, Enhanced Photocatalytic Performance of Graphene-ZnO Nanoplatelet Composite Thin Films Prepared by Electrostatic Spray Deposition, **Ceramics International**(SCI,IF=2.758), 40(2), 3647-3654, Mar. 2014
20. Bhavana N. Joshi, **Hyun Yoon**, Maikel F.A.M. van Hest, Sam S. Yoon*, Niobium-Doped Titania Photocatalyst Film Prepared via a Nonaqueous Sol-Gel Method, **Journal of the American Ceramic Society**(SCI, IF=2.787), 96(8), 2623-2627, Aug. 2013
21. Bhavana N. Joshi, **Hyun Yoon**, Sam S. Yoon*, Structural, Optical and Electrical Properties of Tin Oxide Thin Films by Electrostatic Spray Deposition, **Journal of Electrostatics**(SCI, IF=1.286), 71(1), 48-52, Feb. 2013
22. Ji Hoon Woo, **Hyun Yoon**, Ji Hyun Cha, Duk Young Jung, Sam S. Yoon*, Electrostatic Spray-Deposited CuInGaSe₂ Nanoparticles: Effects of Precursors' Ohnesorge Number, Substrate Temperature, and Flowrate on Thin Film Characteristics, **Journal of Aerosol Science**(SCI, IF=2.278), 54, 1-12, Dec. 2012

23. **Hyun Yoon**, Bhavana Joshi, Seung-Heon Na, Scott C. James, Sam S. Yoon*, Antibacterial Activity and Photocatalysis of Electrospayed Titania Films, **Journal of The Electrochemical Society**(SCI, IF=3.014), 159 (11), H823-H827, Aug. 2012
24. Bhavana N. Joshi, **Hyun Yoon**, Ho Young Kim, Joon Ho Oh, Tae Yeon Seong, Scott C. James, Sam S. Yoon*, Effect of Zinc Acetate Concentration on Structural, Optical and Electrical Properties of ZnO Thin Films Deposited by Electrostatic Spray on an ITO Substrate, **Journal of The Electrochemical Society**(SCI, IF=3.014), 159(8), H716-H721, Jul. 2012
25. **Hyun Yoon**, Ji Hoon Woo, Young Min Ra, Sam S. Yoon*, Ho Young Kim, SeJin Ahn, Jae Ho Yun, Jihye Gwak, KyungHoon Yoon, and Scott C. James, CuInSe₂ (CIS) Thin Film Solar Cells by Electrostatic Spray Deposition, **Journal of The Electrochemical Society**(SCI, IF=3.014), 159(4), H444-H449, Feb. 2012
26. **Hyun Yoon**, Ji Hoon Woo, Young Min Ra, Sam S. Yoon*, Ho Young Kim, SeJin Ahn, Jae Ho Yun, Jihye Gwak, KyungHoon Yoon, and Scott C. James, Electrostatic Spray Deposition of Copper–Indium Thin Films, **Aerosol Science and Technology**(SCI, IF=1.953), 45(12), 1448-1455, Jun. 2011

Note: (*)*, corresponding author / ()¹, equal contribution

PROCEEDING/CONFERENCE PAPERS

1. **Hyun Yoon**, Min-woo Kim, Mukund G. Mali, Tae Yoon Ohm, Sam S. Yoon*, Nano-textured Pillars of Electrospayed Bismuth Vanadate for Efficient Photoelectrochemical Water Splitting, **18th Topical Meeting of the International Society of Electrochemistry(ISE-18)**, Gwangju, Korea, Mar. 8-11, 2016(poster)
2. **Hyun Yoon**, Min-woo Kim, Hong Seok Jo, Sam S. Yoon*, Enhanced photoelectrochemical solar water splitting using a platinum-decorated CIGS/CdS/ZnO photocathode, **18th Topical Meeting of the International Society of Electrochemistry(ISE-18)**, Gwangju, Korea, Mar. 8-11, 2016(poster)
3. **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)
4. Jae-Young Choi, **Hyun Yoon** and Sam S. Yoon*, 3D Nanostructured CIS₂ Thin Film Solar Cell by Electrospinning and Electrospay, **The Global Photovoltaic Conference 2014(GPVC 2014)**, pCIG-P-03, Busan, Korea, Nov. 10-11, 2014(poster)
5. **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)**, pCIG-P-62, Daegu, Korea April 2-3, 2014(poster)
6. **Hyun Yoon**, Jong-Gun Lee, Seongpil An, Jae-Young Choi, You-Hong Cha, Changmin Lee, Sam S. Yoon*, Enhanced Photodegradation Performance of Nb doped ZnO Thin Films prepared by Electrostatic Spray Deposition, **Electrochemical Conference on Energy & the Environment (ECEE 2014)**, p488, Shanghai, China, Mar. 13-16, 2014(poster)
7. **Hyun Yoon**, Jae-Young Choi, Seongpil An, Sam S. Yoon*, SeJin Ahn, Jae Ho Yun, Jihye Gwak, KyungHoon Yoon, Copper-Indium Nanofibers Nanotextured by Electroplating, **The Global Photovoltaic Conference 2013(GPVC 2013)**, p78, Busan, Korea, Nov. 23-26, 2013(poster)

8. **Hyun Yoon**, Seung-Heon Na, Jae-Young Choi, Sam S. Yoon*, Hui Sang Ahn, Byoung Koun Min, SeJin Ahn, Jae Ho Yun, Jihye Gwak, KyungHoon Yoon, Electrostatically Sprayed Cu(InGa)(SSe)₂ Thin Film Solar Cell with 4.63% Efficiency, **The Global Photovoltaic Conference 2013(GPVC 2013)**, p87, Busan, Korea, Nov. 23-26, 2013(poster)
9. Seung-Heon Na, **Hyun Yoon**, Sam S. Yoon*, Fabrication of CIGS/CZTS Thin Film Solar Cell via Electrostatic Spray Deposition, **Korea Photovoltaic Society(KPVS 2013)**, pCIG-P-29, Gyeonggi, Korea April 29-30, 2013(poster)
10. Young Min Ra, **Hyun Yoon**, Bhavana Joshi, Seung-Heon Na, Sam S. Yoon*, Solution/Particle type Thin Film Coating via Electrostatic Spray Deposition, **The Global Photovoltaic Conference 2012(GPVC 2012)**, p249, Busan, Korea, Nov. 19-21, 2012(poster)
11. **Hyun Yoon**, Ji hoon Woo, Young Min Ra, Sam S. Yoon*, CIS Thin Film Coating via Electrostatic spray Deposition and Selenization of Solution Precursors, **The Global Photovoltaic Conference 2011(GPVC 2011)**, p101, Busan, Korea, Sep. 28-30, 2011(poster)
12. Min Wook Lee, Jung Jae Park, **Hyun Yoon**, Sam S. Yoon*, Utilizing Spray Technologies for Particle and Aerosol Coating in Solar Cell Application, **The Global Photovoltaic Conference 2011(GPVC 2011)**, p268, Busan, Korea, Sep. 28-30, 2011(poster)
13. **Hyun Yoon**, Sukgoo Yoon*, Ho Young Kim, Experimental study on CIS thin film deposition via electrostatic spray technique, **The Korean Society for New and Renewable Energy 2010(KSNRE 2010)**, Jeju, Korea, Nov. 15-16, 2010(oral)
14. Dongjo Lee, Sam Yoon*, In Hyuk Hwang, Ho Young Kim, Sejin Ahn, Jae Ho Yun, Jihye Gwak, Kyung Hoon Yoon, Andrew Lee, Paul E. Sojka, Ji Hoon Woo, and **Hyun Yoon**, CIS Thin Film Deposition via Electrostatic Spray Technique, **19th International Photovoltaic Science and Engineering Conference and Exhibition(PVSEC-19)**, p82, Jeju, Korea, Nov. 9-13, 2009

PATENTS (DOMESTIC)

- **Hyun Yoon**, Ji hoon Woo, Young Min Ra, Sam S. Yoon, Cone-Jet Mode Electrostatic Spray Deposition Apparatus, Patent NO. 10-1263591
- Ji hoon Woo, **Hyun Yoon**, Young Min Ra, Sam S. Yoon, Electrostatic Spray Deposition Apparatus, Patent NO. 10-1263592
- Young Min Ra, **Hyun Yoon**, Ji hoon Woo, Sam S. Yoon, Cone-Jet Mode Electrostatic Spray Deposition Apparatus, Patent NO. 10-1263602

THESIS

- Ph.D. Thesis, Compound Semiconductor and Metal Oxide Thin Films for Water Splitting, Korea University, Feb. 2016
- M.S. Thesis, Experimental Study on CIS Thin-Film Coating via Electrostatic Spray Deposition, Korea University, Feb. 2011

AWARDS

- Achievement Award, Korea University Graduate School, Feb., 2016
- Scholarship for the encouragements of research, Korea University Graduate School, College of Engineering, Aug., 2015
- GPVC(The Global Photovoltaic Conference) 2013 Best Poster Presentation Award, “Electrostatically Sprayed Cu(InGa)(SSe)₂ Thin Film Solar Cell with 4.63% Efficiency”, Korea Photovoltaic Society, Busan, Korea, Nov. 23-26, 2013
- Outstanding Graduate Student Award, Korea University Graduate School, Dept. of Mech. Eng., Mar. 2012

CERTIFICATE

- The 2nd Silicon Solar cell Technical Education, Korea University, 2012.02.20-25

FUND GRANTS

- BK21 2009.9-2012.2, 2013.9-2015.8
- Research Assistant, 2009 Fall Semester / 2010 Spring Semester / 2011 Spring Semester / 2011 Fall Semester
- Scholarship for the encouragements of research, Korea University Graduate School, College of Engineering, Aug., 2015

INVITED SEMINARS

1. Invited Seminar at Korea Institute of Energy Research(KIER), Ulsan, Korea, Topic: Compound Semiconductor and Metal Oxide Thin Films for Solar Water Splitting via Electrostatic Spray, Jan. 18, 2016
2. Invited Seminar at Korea Institute of Machinery & Materials(KIMM), Daejeon, Korea, Topic: Compound Semiconductor and Metal Oxide Thin Films for Solar Water Splitting via Electrostatic Spray, Dec. 3, 2015

REFERENCE

Ka-Hyun Kim, Ph.D., Researcher, Adjunct professor

Senior researcher, Korea Institute of Energy Research(KIER)

Adjunct professor, Ulsan National Institute of Science and Technology(UNIST)

UNIST-gil50, Eonyang-eup, Ulju-gun, Ulsan, Korea, 689-851

Tel.: +82-52-217-2954 Cell: +82-10-7929-0519 E-mail: ka-hyun.kim@kier.re.kr

Suk Goo Yoon, Ph.D., Professor

School of Mech. Eng., Korea University

Anam-dong, 5-ga, Sungbuk-gu, Seoul, Korea, 136-713

Tel.: +82-2-3290-3376 Cell: +82-10-9907-3376 E-mail: skyoon@korea.ac.kr

Ho Young Kim, Ph.D., Professor

School of Mech. Eng., Korea University

Anam-dong, 5-ga, Sungbuk-gu, Seoul, Korea, 136-713
Cell: +82-10-3763-7624 E-mail: kimhy@korea.ac.kr

Junemo Koo, Ph.D., Associate Professor

School of Mech. Eng., Kyunghee University
Seocheon-dong , Giheung-gu, Yongin-si, Gyeonggi-do, Korea, 136-713
Tel.: +82-31-201-3834 Cell: +82-10-2701-3833 E-mail: jmkoo@khu.ac.kr

Aforesaid information is true to the best of my knowledge and belief. - Hyun Yoon -