

Dr. Jung-Jae Park



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EDUCATION

Korea University

Ph.D., Department of Mechanical Engineering, 2016

Thesis Title: "The study of Cu(In,Ga)Se₂ nanoparticle-based fabrication of CIGS solar cell by supersonic kinetic spray"

Myongji University

Bachelor of Science in Mechanical Engineering, 2008

EMPLOYMENT

Feb. 2016 to May. 2017: Post-Doctor, Photovoltaic Laboratory, *Korea Institute of Energy Research*

May. 2017 to present: Senior Research Engineer, *Central Research Institute, Korea Hydro & Nuclear Power*

AWARDS

1. Outstanding Graduate Student Award (for PhD candidate), Korea University, Apr., 2011
2. 신입사업 교육우등상, 한국수력원자력, May, 2017
3. 공로상-사장상 1등급, 2020년도 신재생사업 유공직원 포상, 한국수력원자력, Dec., 2020
4. 신진연구자상, 한국태양에너지학회, Dec., 2020
5. 공로상-한국전력공사사장상, 2021년 전력기술 R&D 컨퍼런스 포상, 한국전력공사, Nov., 2021
6. 우수발표논문상장, 한국태양에너지학회, Apr., 2022
7. 감사패, 2022년 전라남도 나주시장, Oct., 2022
8. 표창장, 2022년 전라남도지사, Dec., 2022

PUBLICATIONS

SCI paper

1. **JJ Park**, JG Lee, DY Kim, JH Lee, JH Yun, JH 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, pp. 44-54, 2017(2016-10-10)
2. **JJ Park**, JG Lee, SC James, SS Al-Deyab, SJ Ahn, SS Yoon*, "Thin-film metallization of CuInGaSe₂ nanoparticles by supersonic kinetic spraying", *Computational Materials Science*, 101, pp. 66-76, 2015(2015-02-07)
3. DY Kim, BN Joshi, **JJ Park**, JG Lee, YH Cha, TY Seong, SI Noh, HJ Ahn, SS Al-Deyabe, SS Yoon*, "Graphene-titania

films by supersonic kinetic spraying for enhanced performance of dye-sensitized solar cells" *Ceramics International*, 40, pp. 11089-11097, 2014(2014-08-22)

4. DY Kim, S Sinha-Ray, **JJ Park**, JG Lee, YH Cha, SH Bae, JH Ahn, YC Jung, SM Kim, AL Yarin, SS Yoon*, "Self-healing reduced graphene oxide films by supersonic kinetic spraying", *Advanced Functional Materials*, 24, (31), pp. 4986-4995, 2014(2014-08-20)
5. SP An, CM Lee, MH Liou, HS Jo, **JJ Park**, A Yarin, SS Yoon*, "Supersonically blown ultra-thin thorny devil nanofibers for efficient air cooling", *ACS Applied Materials & Interfaces*, 6, pp. 13657-13666, 2014(2014-07-14)
6. JG Lee, DY Kim, **JJ Park**, YH Cha, JY Yoon, HS Jeon, BK Min, M Swihart, SH Jin, SS Al-Deyabe, SS Yoon*, "Graphene-titania hybrid photoanodes produced by supersonic kinetic aerosol deposition for solar water splitting" *Journal of the American Ceramic Society*, 97(11), pp. 3660-3668, 2014(2014-03-29)
7. **JJ Park**, DY Kim, JG Lee, YH Cha, M Swihart, SS Yoon*, "Supersonic Aerosol-Deposited TiO₂ Photoelectrodes for Photoelectrochemical Solar Water Splitting", *RSC Advances*, 4, pp. 8661-8670, 2014(2014-01-17)
8. AB Gurav, SS Latthe, RS Vhatkar, JG Lee, DY Kim, **JJ Park**, SS Yoon*, "Superhydrophobic surface decorated with vertical ZnO nanorods modified by stearic acid", *Ceramics International*, 40(5), pp. 7151-7160, 2014(2013-12-27)
9. **JJ Park**, DY Kim, SS Latthe, JG Lee, M Swihart, SS Yoon*, "Thermally-Induced Superhydrophilicity in TiO₂ Films Prepared by Supersonic Aerosol Deposition", *ACS Applied Materials & Interfaces*, 5, pp. 6155-6160, 2013(2013-06-12)
10. DY Kim, **JJ Park**, JG Lee, HY Kim, DH Kim, SJ Tark, SJ Ahn, JH Yun, JH Gwak, S Chandra, KH Yoon, SS Yoon, "Cold Spray Deposition of Copper Electrodes on Silicon and Glass Substrates" *Journal of Thermal Spray Technology*, 22(7), pp. 1092-1102, 2013(2013-06-11)
11. 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*, 95(12), pp. 3955-3961, 2013(2013-05-14)
12. **JJ Park**, Do-Yeon Kim, Jong-Gun Lee, Donghwan Kim, Joon-Ho Oh, Tae-Yeon Seong, Maikel F.A.M. van Hest, SS Yoon*, "Superhydrophilic Transparent Titania Films by Supersonic Aerosol Deposition", *Journal of the American Ceramic Society*, 96(5), pp. 1596-1601, 2013(2012-11-28)
13. **JJ Park**, JG Lee, DY Kim, JH Hong, JJ Kim, SK Hong, and SS Yoon*, "Antibacterial and Water Purification Activities of Self-Assembled Honeycomb Structure of Aerosol Deposited Titania Film", *Environmental Science & Technology*, 46, pp. 12510-12518, 2012(2012-10-30)
14. DY Kim, **JJ Park**, JG Lee, MW Lee, JH Oh, TY Seong, DH Kim, SC James, MF 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(2012-09-06)
15. MW Lee, **JJ Park**, Massoud Massoudi Farid, SS Yoon*, "Comparison and correction of the drop breakup models for stochastic dilute spray flow", *Applied Mathematical Modelling*, 36, pp. 4512-4520, 2012(2012-02-03)
16. MW Lee, **JJ Park**, DY Kim, SS Yoon*, HY Kim, SC James, S Chandra, JH Ryu, WH Yoon, DS Park, "Optimization of supersonic nozzle flow for titanium dioxide thin-film coating by aerosol deposition", *Journal of Aerosol Science*, 42, pp. 771-780, 2011(2011-07-22)
17. MW Lee, **JJ Park**, DY Kim, SS Yoon, HY Kim, SC James, S Chandra, T Coyle, "Numerical studies on the effects of stagnation pressure and temperature on supersonic flow characteristics in cold spray applications", *Journal of Thermal Spray Technology*, 20(5), September, pp. 1085-1097, 2011(2011-03-25)
18. **JJ Park**, MW Lee, SS Yoon*, HY Kim, SC James, SD Heister, S Chandra, WH Yoon, DS Park, JH Ryu, "Supersonic nozzle flow simulations for particle coating applications: Effects of shockwaves, nozzle geometry, ambient pressure, and substrate

KCI paper

1. GY Jo, JH YU, **JJ Park**, NR Yang, CH Lim*, TS Park*, "Study on Economic Analysis of Independent pillar type agrophotovoltaic and High Value-Added Crop Cultivation", *Journal of the Korean Solar Energy Society*, Vol.43, No.1, pp.13-22, Feb, 2023
2. YC Shin, JW Park, GY Jo, CH Lim, **JJ Park***, "Study on the Comparison of the Computer Simulation and Empirical Measurement of Solar Radiation in Farmland under the Independent Pillar type Agrophotovoltaic System", *Journal of the Korean Solar Energy Society*, Vol.43, No.1, pp.23-33, Feb, 2023
3. **JJ Park***, CY Park, JW Ryu, "Hail Impact Analysis of Photovoltaic Module using IEC Test", *Journal of the Korean Solar Energy Society*, Vol.40, No.4, pp.23-33, Aug, 2020

Note: *, corresponding author

PRESENTATIONS

1. GY Jo, YC Shin, **JJ Park**, CH Lim, "Analysis of economic feasibility through cultivation of blueberries in the lower part of independent pillar type APV system", *Agrivoltaics2023*, Apr., 2023.
2. GY Jo, **JJ Park**, CH Im, "Analysis of the economic feasibility of power generation and high value-added crops of solar power combined with independent pillar type agrophotovoltaic system", *The Korea Photovoltaic Society*, Mar., 2023.
3. **JJ Park**, GY Jo, MS Kim, NR Yang, CH Lim, "Analysis of blueberry growth characteristics under the 20kW independent pillar type agrophotovoltaic system", *The Korea Photovoltaic Society, Jeju Oct.*, 2022.
4. JW Park, CS Kim, **JJ Park***, "A Study on the Improvement of the Korean-type Agro-photovoltaic Power Generation System and the Development of a Smart Farming System", *The Korea Photovoltaic Society, Jeju Oct.*, 2022.
5. **JJ Park**, GY Jo, MS Kim, GH Kim, CH Lim*, "DERIVATION OF SOLAR-RADIATION IMPROVEMENT MODEL OF PILLAR-TYPE APV THROUGH LOWER SHADE ANALYSIS" GPVC(Global Photovoltaic Conference) 2022, Gwangju, Jul., 2022.
6. **JJ Park**, GH Kim, GW Jo, OC Lee, CH Lim*, "Development of model to improve the optical environment of pillar type agrophotovoltaic system using under shading simulation", *The Korean Solar Energy Society*, Bo Ryeong, Apr., 2022
7. **JJ Park**, GH Kim, GW Jo, OC Lee, CH Lim*, "Development of a model to improve the economic and durability of the pillar-type agrophotovoltaic system", *The Korean Solar Energy Society*, Bo Ryeong, Apr., 2022
8. **JJ Park***, CS Kim, "The study of design procedure for floating photovoltaic system under ocean environment", *The Korean Solar Energy Society*, Bo Ryeong, Apr., 2022
9. KH Kang, **JJ Park**, HC Chang, "A STUDY ON THE STRESS ANALYSIS OF COLUMN-TYPE AGRI-PV STRUCTURES BY DIAMETER VARIATION", *Asia-Pacific Forum on Renewable Energy(AFORE) 2021*, Jeju, Oct., 2021.
10. KH Kang, **JJ Park**, HC Chang, "A STUDY ON THE STRESS ANALYSIS OF COLUMN-TYPE AGRI-PV STRUCTURES BY THE NUMBER OF PANELS", *Asia-Pacific Forum on Renewable Energy(AFORE) 2021*, Jeju, Oct., 2021.
11. **JJ Park***, KH Kang, SH Lee, JM Park, SK Lee, "Performance Evaluation on Floating Photovoltaic System Model Experiment", *Asia-Pacific Forum on Renewable Energy(AFORE) 2021*, Jeju, Oct., 2021.
12. **JJ Park***, KH Kang, SH Lee, JM Park, SK Lee, "Empirical research on flexible thin film solar system utilizing curved roofs", *Asia-Pacific Forum on Renewable Energy(AFORE) 2021*, Jeju, Oct., 2021.
13. **JJ Park***, SK Lee, JH Yoon, "DEMONSTRATION RESEARCH ON LIGHTWEIGHT ROOFTOP PHOTOVOLTAIC SYSTEM", *Global Photovoltaic Conference 2021*, Gwangju, Jul., 2021.
14. KH Kang, SK Lee, SH Lee, W Chae, GH Kim, JH Yun, JH Lee, **JJ Park***, "Empirical study on building integrate photovoltaic (BIPV) using thin film solar module", *The Korean Solar Energy Society*, Bo Ryeong, 12-14, May, 2021
15. **JJ Park***, "An Analysis of Case Studies of Roof-top Photovoltaic System", *The Korean Society for New and Renewable Energy*, Online, 24-25 Aug, 2020

16. **JJ Park***, "Analysis on the Damage Behavior of Photovoltaic module under Hail Impact", *The Korean Society for New and Renewable Energy*, Online, 24-25 Aug, 2020
17. **JJ Park***, "Introduction to 3kW Field Test Study of Roof-top PV System Using the Light and Flexible PV Module", *The Korean Society for New and Renewable Energy*, Online, 24-25 Aug, 2020
18. **JJ Park***, JW Ryu, "A Review Installation Examples and Application Method for Empirical Studies on Roof-top Photovoltaic System", *The Korean Solar Energy Society*, Online, 25, Jun, 2020
19. **JJ Park***, JW Ryu, "Introduction to Empirical Studies of Roof-top PV Power System Utilizing the Light PV Module", *The Korean Solar Energy Society*, Online, 25, Jun, 2020
20. **JJ Park***, TW Kim, SK Lee, CY Park, KS Lee*, "DEVELOPMENT STRATEGY OF FIELD TEST STUDIES OF ROOFTOP PHOTOVOLTAIC SYSTEM", *9th Asia Pacific Forum on Renewable Energy*, JeJu, Korea, 13-16, Nov, 2019
21. **JJ Park**, JH Jang, MS Shin, TW Kim, SK Lee, CY Park, KS Lee*, "PERFORMANCE ANALYSIS OF ROOFTOP PHOTOVOLTAIC SYSTEM", *9th Asia Pacific Forum on Renewable Energy*, JeJu, Korea, 13-16, Nov, 2019
22. **JJ Park***, "Roof-top photovoltaic power system utilizing the light PV module: present status and prospects", *Asian International Conference on Fluid Machinery*, Busan, Korea, 25-27 Sep, 2019
23. **JJ Park***, "Trends and Applications of Bifacial Photovoltaic Technology", *The Korean Society for New and Renewable Energy*, Busan, Korea, 23-24, May, 2019
24. **JJ Park***, "Trends in the Development of Integrated Technologies of the 4th Industrial Revolution and Photovoltaic Technology", *The Korean Society for New and Renewable Energy*, Busan, Korea, 23-24, May, 2019
25. **JJ Park***, "PV MODULE CLEANING DEVICES", *Global Photovoltaic Conferences 2019 (GPVC 2019)*, Gwangju, Korea, 13-15, Mar, 2019
26. **JJ Park***, "ECONOMIC ANALYSIS OF PV POWER GENERATION USING THE RETSCREEN MODEL", *Global Photovoltaic Conferences 2019 (GPVC 2019)*, Gwangju, Korea, 13-15, Mar, 2019
27. **JJ Park***, "Analysis of Floating Photovoltaic Potentials in Pumped Storage Power Plant Reservoir", *The Korean Society for New and Renewable Energy*, Jeju, Korea, 19-21, Nov, 2018
28. **JJ Park***, "Status of Flexible Thin Film Solar Cells in Research and Market", *The Korean Society for New and Renewable Energy*, Seoul, Korea, 19-20, Apr, 2018
29. **JJ Park***, TW Kim, "KHNP's Development Possibility of Roof-top CIGS Thin Film Solar System", *GPVC2018*, Gwangju, Korea, 14-16, Mar, 2018
30. **JJ Park**, JH Park, SJ Ahn, YJ Eo, JH Gwak, Ara Cho, JS You, KH Kim, SK Ahn, KS Shin, KH Yoon, JH Yun, "Effect of Light-trapping using Ag Thin Film in CIGS Solar Cell", *The Korea Photovoltaic Society*, Cheongju, Korea, 13-14, Oct, 2016
31. SM Song, **JJ Park**, YJ Eo, KH Kim, SK Ahn, JH Gwak, JS Jo, KS Shin, JH Yoon*, "알칼리 PDT를 통한 고효율 유연기판 CIGS 태양전지 제조", *The Korea Photovoltaic Society*, Cheongju, Korea, 13-14, Oct, 2016
32. **JJ Park**, JH Park, SJ Ahn, YJ Eo, JH Gwak, A Cho, JS You, KH Kim, SK Ahn, KS Shin, KH Yoon, JH Yoon*, Study of Plasmonic Effect for Light Trapping in CIGS Solar Cells, *The Korean Society for New and Renewable Energy*, Jeju, Korea, 23-25, May, 2016
33. **JJ Park**, NK Yoon, SM Song, JH Choi, SJ Ahn, YJ Eo, JH Gwak, A Cho, JS You, KH Kim, SK Ahn, KS Shin, KH Yoon, JH Yoon*, The optimization process of rapid sputtered Al-doped ZnO film for CIGS solar cell, Daegu, Korea, 6-8, Apr. Korea
34. **JJ Park**, JG Lee, DY Kim, SJ Ahn, SS Yoon*, Impurity-Free Cu(InGa)Se₂ Thin Film Produced at Room Temperature by Supersonic Kinetic Spray, *PVSEC-25*, Busan, Korea, 15-20, Nov. 2015
35. **JJ Park**, YJ Eo, SS Yoon*, JH Yun*, The studies of thickness and substrate temperature on Al-doped ZnO film for CIGS thin film solar cell, *The Korean Society for New and Renewable Energy*, Busan, Korea, 11-12, Jun. 2015
36. **JJ Park**, SS Yoon*, Kinetically Metallized Carbon-free CuInGaSe₂ Solar Cell by Supersonic Spraying Dry Nanoparticles, *WCPEC (World Conference on Photovoltaic Energy Conversion)*, Kyoto, Japan, 23-27, Nov. 2014
37. YH Cha, BY Bang, **JJ Park**, SS Yoon*, Numerical Investigation on Effect of Pressure from Explosive Blast Waves in Petrochemical Refinery Plants, *KSME (The Korea Society of Mechanical Engineers)*, Gwangju, Korea, 11-14, Nov. 2014
38. SS Yoon*, **JJ Park**, Carbon-free CuInGaSe₂ Solar Cell by Kinetic Spraying Dry Nanoparticles, *Global Photovoltaic Conferences 2014 (GPVC 2014)*, Busan, Korea, 10-11, Nov. 2014

39. **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, 23-26, Nov. 2013
40. **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, 23-26, Nov. 2013
41. BJ Kang, SE Park, YD Kim, ST Kim, HS Lee, DY Lee, **JJ Park**, SS Yoon*, DH Kim, Copper Front Electrode in Crystalline Silicon Solar Cells Fabricated by Cold Spray Deposition, *Global Photovoltaic Conferences 2013 (GPVC 2013)*, Busan, Korea, 23-26, Nov. 2013
42. **JJ Park**, DY Kim, JG Lee, SS Yoon*, Solution Precursor Graphene Coating by Cold Spray, *KSME (The Korea Society of Mechanical Engineers)*, Jeju, Korea, 9-10, May, 2013
43. DY Kim, **JJ Park**, JG Lee, SS Yoon*, Fabrication of CISSe Thin Film Solar Cell via Cold Spray, *KPVC (Korea Photovoltaic Society 2013)*, Suwan, Korea, 29-30, Apr, 2013
44. JG Lee, **JJ Park**, DY Kim, SS Yoon*, Low-cost Copper-based Front Electrode Manufacture for Crystalline Silicon and CIS Solar Cells by Cold Spray, *GPVC (Global Photovoltaic Conference 2012)*, Pusan, Korea, 27-29, Aug, 2012
45. MW Lee, **JJ Park**, DK Kang, DY Kim, Utilizing Spray Technologies for Particle and Aerosol Coating in Solar Cell Applications, *The 23rd ILASS-AMERICAS 2011*, Ventura, California, USA, 15-18, May. 2011
46. DY Kim, MW Lee, **JJ Park**, SS Yoon*, and HY Kim, Optimization of Supersonic Nozzle Flow for Thin-film Coating by Aerosol Deposition, *KSME (The Korea Society of Mechanical Engineers)*, POSTECH, Pohang, Korea, 24-29, Apr. 2011
47. **JJ Park**, SS Yoon*, HY Kim, Numerical study on the effects of nozzle geometry and substrate location in the supersonic flow, *KSNRE (Annual Spring Meeting of The Korean Society for New & Renewable Energy 2010)*, Mokpo, Korea, 17-19, Jun. 2010
48. MW Lee, **JJ Park**, SS Yoon*, HY Kim, SC James, S Chandra, JH Ryu, WH Yoon, DS Park, Simulation of Aerosol Deposition Supersonic Nozzle Flow for Applications in Nano-particle Coating at Room Temperature, *Renewable Energy 2010*, Yokohama, Japan, June 27-July 2, 2010.
49. IH Hwang, DJ Lee, SS Yoon*, HY Kim, MW Lee, **JJ Park** and SC James, Splashing Characteristics of Monodisperse Sprays with Significant Viscosity Differences Impacting a Flat Surface, *The 6th Asia-Pacific Drying Conference*, Bangkok, Thailand, 19-21, Oct..2009.

Note: *, corresponding author

DOMESTIC PATENT

1. **JJ Park**, DY Kim, SS Yoon, “에어로졸 입자 공급장치 및 이를 이용한 에어로졸 증착 장치, Aerosol particle supplying apparatus and aerosol deposition apparatus using the same”, 등록번호 10-1209349, 등록번호 2012-11-30
2. **JJ Park**, DY Kim, MW Lee, SS Yoon, DH Kim, “태양전지 도선 전극 제조 장치, Apparatus for cold spraying grid line on a solar cell substrate”, 등록번호 10-1217304, 등록일자 2012-12-24
3. DY Kim, **JJ Park**, SS Yoon, “무기물 박막 태양전지 제조 장치, Apparatus for cold spraying inorganic layers on a solar cell substrate”, 등록번호 10-1217330, 등록일자 2012-12-24
4. MY Lee, DY Kim, **JJ Park**, SS Yoon, MJ Ko, “염료감응형 태양전지 에어로졸 증착 장치 및 이를 사용한 에어로졸 증착 방법, Apparatus for coating blocking layer for DSSC and method for using the same”, 등록번호 10-1202827, 등록일자 2012-11-13
5. MW Lee, **JJ Park**, DY Kim, SS Yoon, “태양전지 제조 장치 및 이의 제어 방법, Apparatus for manufacturing solar cell substrate and method for controlling the same”, 등록번호 10-1242299, 등록일자 2013-03-05
6. MW Lee, **JJ Park**, DY Kim, SS Yoon, “태양전지 전극 및 패시베이션층 제조 장치, Apparatus for spraying grid line and passivation layer on a solar cell substrate”, 등록번호 10-1242352, 등록일자 2013-03-05

7. MW Lee, DY Kim, DK Kang, **JJ Park**, SS Yoon, “전기 방사 장치, Electrospinning Apparatus”, 출원번호 10-2011-0104222, 출원일자 2011-10-12
8. **JJ Park**, DY Kim, SS Yoon, JG Lee, “무기물 박막 태양전지 제조 장치 및 이의 제어 방법”, 등록번호 10-1311107, 등록일자 2013-09-13
9. MW Lee, DY Kim, **JJ Park**, SS Yoon, “전기 방사 장치, Electrospinning apparatus with supersonic stream nozzle”, 등록번호 10-1382860, 등록일자 2014-04-01
10. MW Lee, SP An, **JJ Park**, SS Yoon, “항균 코팅층 형성 장치, Coating apparatus of anti-bacterial coating layer using electrospinning and electrostatic spray deposition method”, 등록번호 10-1375996, 등록일자 2014-03-12
11. **JJ Park**, SS Yoon, DY Kim, “저온 스프레이 방식 그래핀 증착 장치, Apparatus for Coating Graphene Film Using Cold Spray”, 등록번호 10-1518545, 등록일자 2015-04-30
12. JG Lee, SS Yoon, **JJ Park**, DY Kim, “초음속 노즐을 이용한 종입자 분쇄, Seed particle pulverization via supersonic nozzle”, 출원번호 10-2015-0105968, 등록일자 2015-07-27
13. **JJ Park**, “자연 대류 냉각 기능을 갖는 태양전지 모듈, {Solar Battery Module with Air Cooling System Using Convection” 출원번호 10-2018-0035991
14. **JJ Park**, “수차를 이용한 수상태양광 모듈 냉각 및 청소 장치, Apparatus for cleaning and cooling floating solar power using water wheel” 등록번호 10-2061025, 등록일자 2019.12.24
15. **JJ Park**, “파동에너지를 이용한 수상 태양광발전 모듈 냉각 및 청소장치, Apparatus for cleaning and cooling floating solar power using wave energy” 등록번호 10-2068023, 등록일자 2020.01.14
16. **JJ Park**, “수상 태양광발전 장치의 계류선 이물질 제거 시스템, Foreign Matter Removing Device From Mooring Line of Solar Power Generation” 등록번호 10-2061029, 등록일자 2019.12.24
17. **JJ Park**, TW Kim, JJ Shin, HB Lee, “부유식 전력공급선을 이용한 수상태양광 발전 시스템, Solar Power Generation System Using Floating Power Line” 등록번호 10-2068022, 등록일자 2020.01.14
18. **JJ Park**, TW Kim, JJ Shin, HB Lee, “조립식 부유체 모듈의 하중분포 균일 분산 장치, load dispersion device for prefabricated float module” 등록번호 10-2061028, 등록일자 2019.12.24
19. JJ Shin, TW Kim, HB Lee, **JJ Park**, “수위차를 이용한 냉각 시스템이 구비된 수상 태양광 발전시스템, Floating photovoltaic system having a cooling system using the difference of water level” 등록번호 10-2093501, 등록일자 2020.03.19
20. JJ Shin, TW Kim, HB Lee, **JJ Park**, YB Lee, “풍력을 이용한 냉각 시스템이 구비된 수상 태양광 발전시스템, Floating photovoltaic system having a cooling system utilizing of wind force” 등록번호 10-2085618, 등록일자 2020.03.02
21. TW Kim, JJ Shin, **JJ Park**, HB Lee, “태양광 모듈의 냉각 및 풍압 저감 구조가 적용된 수상태양광 발전 시스템, Water PV system with solar panel cooling and wind pressure reduction structure”, 등록번호 10-2061033, 등록일자 2019.12.24
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Aforesaid information is true to the best of my knowledge and belief.

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