

## CURRICULUM VITAE

### Kyung-Won Park, Ph. D.

Professor

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### Biography

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Kyung-Won Park is an electrochemical energy scientist who performs research in electrochemical energy conversion and storage. In the fields of electrochemical energy conversion and storage, he has studied a wide range of multidisciplinary issues. His past and ongoing research topics cover *relationships between electrochemical energy/system and various materials, effects of structures and dimensions of nano-sized materials on electrochemical energy conversion and storage, synthesis and characterization of highly efficient and durable electrochemistry-related materials, design of novel electrochemical energy systems*, etc.

He has been leading a variety of government and industry-funded research projects, including projects sponsored by National Research Foundation of Korea, Korea Institute of Energy Research, Korea Battery Research Association, Hyundai Motor Company, and many others. With over 20 years of research activities, he has published *more than 200 SCI papers and more than 60 registered domestic and international patents* and has received several awards including *Oronzio de Nora Foundation Prize on Electrochemical Energy Conversion, International Society of Electrochemistry (ISE), 2006* and *Minister Achievement Award, The Ministry of Science and Technology, S. Korea, 2019*. *Especially, he has been currently teaching 15 graduate students and advised 56 graduate students as of 2024.*

Dr. Park received his B.S. in Materials Science and Engineering from Sungkyunkwan University, S. Korea in 1996 and M.S and Ph.D. degrees from Materials Science and Engineering, Gwangju Institute of Science and Technology (GIST), S. Korea in 1998 and 2003, respectively. During his graduate training with *continuous government scholarship*, Park received Excellent Graduate Student Award, GIST, and *Student Research Award of the Battery Division from the Electrochemical Society, US*. He was trained as a postdoctoral scholar at Research Center for Energy Conversion and Storage in Seoul National University in 2003~2004. He worked as a postdoctoral scholar at The Pennsylvania State University, US in 2004~2005.

**Keywords:** Electrochemical Energy Conversion and Storage; Fuel Cells; Water Electrolysis; Batteries; Electrochemical Energy-related Nanostructure Materials; Electrochemistry-based Applications

**Total Citations: 10375, H-Index: 51** (Google Scholar; as of April 2024)

### Education & Training

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**Postdoc.** | The Pennsylvania State University, US, 2004~2005

**Postdoc.** | Research Center for Energy Conversion and Storage, Seoul National University, Korea, 2003~2004

**Ph. D.** | Materials Science and Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, S. Korea, 1998~2003 (Thesis: Design and Characterization of Pt-based Nanostructure Electrocatalysts for Methanol Electrooxidation in Direct Methanol Fuel Cells, selected as Excellent Graduate Student Award, GIST, BK21)

**M.S.** | Materials Science and Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, S. Korea, 1996~1998 (Thesis title: Selective Area MOVPE for Photonic Device Integration)

**B.S.** | Materials Science and Engineering, Sungkyunkwan University, Suwon, S. Korea, 1992~1996

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## ***Academic Positions & Appointments***

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**Department Head** | Department of Chemical Engineering, Soongsil University, S. Korea, 2021~2023  
**Professor** | Department of Chemical Engineering, Soongsil University, S. Korea, 2016~present  
**Associate Professor** | Department of Chemical Engineering, Soongsil University, S. Korea, 2011~2016  
**Program Director**, Accreditation Board for Engineering Education of Korea (ABEEK), Chemical Engineering, Soongsil University, S. Korea, 2006~2008  
**Assistant Professor** | Department of Chemical Engineering, Soongsil University, S. Korea, 2005~2011

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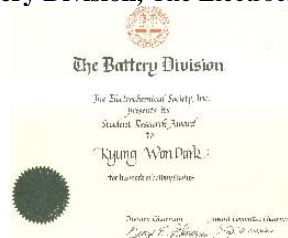
## ***Honors & Awards***

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**Soongsil Teaching Award**, Soongsil University, 2022  
**Achievement Award**, The Korean Society of Industrial and Engineering Chemistry, 2021  
**Soongsil Research Award**, Soongsil University, 2021  
**Best Soongsil Research Award**, Soongsil University, 2020  
**Minister Achievement Award**, The Ministry of Science and Technology, S. Korea, 2019  
**Achievement Award**, The Korean Society of Industrial and Engineering Chemistry, 2019  
**Best Soongsil Research Award**, Soongsil University, 2019  
**Achievement Award**, The Korean Society of Industrial and Engineering Chemistry, 2018  
**Best Soongsil Research Award**, Soongsil University, 2018  
**Achievement Award**, The Korean Society of Industrial and Engineering Chemistry, 2017  
**Best Soongsil Research Award**, Soongsil University, 2017  
**Selected as “National Outstanding Research Achievement”**, The Ministry of Science & Technology, 2017  
**Achievement Award**, The Korean Society of Industrial and Engineering Chemistry, 2016  
**Best Soongsil Research Award**, Soongsil University, 2016  
**Soongsil Research Award**, Soongsil University, 2014  
**Best Soongsil Research Award**, Soongsil University, 2013  
**Best Soongsil Research Award**, Soongsil University, 2012  
**Best Soongsil Research Award**, Soongsil University, 2011  
**Outstanding Engineering Research Award**, Soongsil University, 2008  
**Oronzio de Nora Foundation Prize on Electrochemical Energy Conversion**, International Society of Electrochemistry (ISE), 2006



**Student Research Award of the Battery Division**, The Electrochemical Society, US, 2003



**Excellent Graduate Student Award**, Gwangju Institute of Science and Technology, BK21, 2003  
**Best Presentation Award**, Fuel Cell Symposium, The Korean Electrochemical Society, 2003  
**Best Presentation Award**, Fuel Cell Symposium, The Korean Electrochemical Society, 2002  
**Best Presentation Award**, The Korean Chemical Society, 2001  
**Best Presentation Award**, The Korean Electrochemical Society, 2000  
**Korean Government Scholarship**, 1996~2002

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## ***Professional Activities***

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### **Editorial Board Memberships / Conference Organization**

**Editorial Board member**, Batteries (ISSN: 1226-086X), 2023~present

**Editor**, Journal of Industrial Engineering and Chemistry (ISSN: 1226-086X), 2014~2019

**Editorial Director**, The Korean Society of Industrial and Engineering Chemistry, 2014-2019

**Editorial Director**, The Korean Electrochemical Society, 2010-2011

**Academic Director**, The Korean Electrochemical Society, 2008-2009

### **Reviewer of Scientific Journals**

#### **Electrochemical Energy Storage and Conversion**

Applied Catalysis B: Environmental, Elsevier.

ACS Sustainable Chemistry & Engineering, ACS.

Journal of The Electrochemical Society, ECS.

Energy Storage Materials, Elsevier.

Electrochimica Acta, Elsevier.

International Journal of Hydrogen Energy, Elsevier.

ChemCatChem, Wiley.

Journal of Electroanalytical Chemistry, Elsevier.

Journal of Power Sources, Elsevier.

Chemical Engineering Journal, Elsevier.

Applied Catalysis A: General, Elsevier.

Journal of Energy Chemistry, Elsevier.

Energy & Fuels, ACS.

Nature Communications, Springer.

#### **Nanostructures & Materials**

ACS Nano, ACS.

Small, Wiley.

Advanced Functional Materials, Wiley.

Journal of Alloys and Compounds, Elsevier.

Solid State Communications, Elsevier.

Materials Today Chemistry, Elsevier.

ACS Applied Nano Materials, ACS.

ACS Applied Materials & Interfaces, ACS.

Composites Part B, Elsevier.

Applied Surface Science, Elsevier.

Materials Chemistry and Physics, Elsevier.

### **Service Activities**

#### **National / Regional**

**Reviewer**, On-line evaluation of FOUR Brain Korea21, National Research Foundation of Korea, July 2024

**Reviewer**, On-line evaluation of FOUR Brain Korea21, National Research Foundation of Korea, November 2024

**Reviewer**, On-line evaluation of Engineering Research Center (ERC), National Research Foundation of Korea, 2024

**Reviewer**, On-line evaluation of Mid-level Research Projects, National Research Foundation of Korea, 2023

**Reviewer**, On-line evaluation of Postdoc Domestic Training Projects, National Research Foundation of

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Korea, 2023

**Reviewer**, On-line evaluation of Mid-level Research Projects, National Research Foundation of Korea, 2022

**Reviewer**, On-line evaluation of Young Researcher Projects, National Research Foundation of Korea, 2022

**Reviewer**, On-line evaluation of Excellent Young Researcher Projects, National Research Foundation of Korea, 2021

**Reviewer**, On-line evaluation of Postdoc Oversea Training Projects, National Research Foundation of Korea, 2021

**Reviewer**, On-line evaluation of Mid-level Research Projects, National Research Foundation of Korea, 2020

**Reviewer**, On-line evaluation of Postdoc Oversea Training Projects, National Research Foundation of Korea, 2020

**Reviewer**, On-line evaluation of Basic Research Projects, National Research Foundation of Korea, 2020

**Reviewer**, On-line evaluation of Young Researcher Projects, National Research Foundation of Korea, 2019

**Reviewer**, On-line evaluation of Postdoc Oversea Training Projects, National Research Foundation of Korea, 2019

**Reviewer**, On-line evaluation of Basic Research Projects, National Research Foundation of Korea, 2019

**Reviewer**, On-line evaluation of Basic Research Projects, National Research Foundation of Korea, 2018

**Reviewer**, On-line evaluation of Young Researcher Projects, National Research Foundation of Korea, 2015

**Reviewer**, On-line evaluation of Young Researcher Projects, National Research Foundation of Korea, 2014

**Reviewer**, On-line evaluation of Mid-level Research Projects, National Research Foundation of Korea, 2014

**Review Panelist**, Technology development project linked to commercialization, Korea Institute for Advancement of Technology, 2014

#### **University / Departmental**

**Department Head**, Undergraduate & Graduate Programs, Chemical Engineering, Soongsil University, S. Korea, 2021~2023

**Center Director**, Energy Convergence Center, Soongsil University, S. Korea, 2017~present

**Center Director**, Center for Ultra-small Five Sense Sensor Convergence Information Technology, Soongsil University, S. Korea, 2014~2016

**Committee Member**, Institute of Convergence Technology, Soongsil University, S. Korea, 2010~2012

**Committee Member**, New Undergraduate Student Admissions, Soongsil University, S. Korea, 2009~2011

**Program Director**, Accreditation Board for Engineering Education of Korea (ABEEK), Chemical Engineering, Soongsil University, S. Korea, 2006~2008

#### **Professional Memberships**

Member of International Society of Electrochemistry (ISE)

Member of Materials Research Society (USA)

Member of The Electrochemical Society (USA)

Member of American Chemical Society (ACS)

Member of The Korean Society of Industrial and Engineering Chemistry

Member of The Korean Electrochemical Society

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## Research Projects

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### Ongoing Projects

**KOLON (2024KOL) | \$72,000 | 04/2024~03/2025**

**Title:** Development of new electrode material post-treatment process for anion-exchange membrane water electrolysis and electrochemical performance evaluation

**Source:** KOLON Industries Co. Ltd., Korea

**Role:** Principal Investigator

**Description:** (Classified)

**H2Korea | \$445,500 | 03/2024~02/2025**

**Title:** Regionally linked hydrogen industry innovative talent training project

**Source:** Ministry of Trade, Industry and Energy of Korea

**Role:** Principal Investigator

**Description:** Develop professional and systematic regionally linked curriculum in accordance with regional hydrogen industry development policies and cultivate excellent talent in the hydrogen field tailored to industry and academia

**NRF (2022M3H4A3A01083536) | \$517,000 | 07/2022~12/2026**

**Title:** Development of surface stabilization methods for a highly durable porous transport layer in proton exchange membrane water electrolysis

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to develop surface stabilization methods for a highly durable porous transport layer in proton exchange membrane water electrolysis.

**NRF (2020R1A6A1A03044977) | \$5,670,000 | 06/2020~05/2029**

**Title:** University-focused research institute support project in the field of science and engineering

**Source:** National Research Foundation of Korea

**Role:** Co-Investigator

**Description:** The goal of this project is to establish smart integrated management systems and education platforms to improve industrial and living environments.

### Past Projects

**NRF (2020R1A2C2010510) | \$495,000 | 03/2020~02/2023**

**Title:** Research on functional interfacial structure for lithium-based high-capacity energy storage

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate functional interfacial structures for lithium-based high-capacity energy storage devices.

**BE (201930961862) | \$90,000 | 11/2019~11/2021**

**Title:** Development of high-capacity hydrogen-iodine redox flow battery element technology

**Source:** Boyaz Energy Co., Ltd.

**Role:** Principal Investigator

**Description:** (Classified)

**NRF (2019M3E6A1104186) | \$1,260,000 | 12/2019~12/2023**

**Title:** Development of high current density (1A/cm<sup>2</sup> @ 1.7 V) water electrolysis system using lithium-ion exchange membrane

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

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**Description:** The goal of this project is to develop a high current density water electrolysis system using lithium-ion exchange membrane.

**BE (2018) | \$45,000 | 09/2017~09/2018**

**Title:** Development of nanostructured catalyst and support for high-efficiency hydrogen generator

**Source:** Boyaz Energy Co., Ltd.

**Role:** Principal Investigator

**Description:** (Classified)

**SMBT (2017) | \$37,000 | 09/2017~08/2018**

**Title:** Development of 300W fuel cell using non-precious metal oxygen reduction catalyst

**Source:** Small and Medium Business Technology Information Promotion Agency

**Role:** Principal Investigator

**Description:** The goal of this project is to develop 300W fuel cell using non-precious metal oxygen reduction catalyst.

**SMBT (C0503227) | \$32,000 | 06/2017~05/2018**

**Title:** Development of commercialization technology for high-capacity (500mWh/g) metal-air fuel cell

**Source:** Small and Medium Business Technology Information Promotion Agency

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate commercialization technology for high-capacity metal-air fuel cell.

**NRF (2017M1A2A2086648) | \$1,469,000 | 12/2017~01/2022**

**Title:** Development of VOCs reduction technology using electrochemical low-temperature oxidation method

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate VOCs reduction technology using electrochemical low-temperature oxidation method.

**NRF (2016R1A2B2016033) | \$449,000 | 06/2016~05/2019**

**Title:** Development of highly efficient oxygen reduction catalysts using optical analysis and quantum chemical calculations

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate highly efficient oxygen reduction catalysts using optical analysis and quantum chemical calculations.

**NRF (BK2016) | \$1,490,000 | 03/2016~02/2020**

**Title:** Graduate student training project for beauty-related engineering (Brain Korea Plus)

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to train graduate students for beauty-related engineering.

**CNU (20153030031670) | \$306,000 | 12/2015~09/2018**

**Title:** High efficiency (over 45%), long life (over 100 cycles) integrated reversible fuel cell

**Source:** Chonnam National University

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate nanostructure catalysts for an integrated reversible fuel cell with high efficiency and long-life cycle.

**KIER (20148520120160) | \$135,000 | 12/2014~11/2017**

**Title:** Development of 100 W polymer fuel cell stack with porous gas flow path

**Source:** Korea Institute of Energy Research

**Role:** Principal Investigator

**Description:** The goal of this project is to develop Pt-based catalysts for 100 W polymer fuel cell stack.

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*(International co-working project with Imperial College London).*

**KITEP (20138520030800) | \$864,000 | 12/2013~11/2016**

**Title:** Development of precious metal-zero low-temperature fuel cells based on high-performance multidimensional carbon nano fusion structure

**Source:** Korea Institute of Energy Technology Evaluation and Planning

**Role:** Principal Investigator

**Description:** The goal of this project is to develop precious metal-zero low-temperature fuel cells based on high-performance multidimensional carbon nanostructures (*International co-working project with Oxford University*).

**NRF (2013R1A1A2012541) | \$135,000 | 06/2013~05/2016**

**Title:** Development of triple-junction nanoelectrode materials for highly reliable electrochemical reactions

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate triple-junction nanoelectrode materials for highly reliable electrochemical reactions.

**ID (2013) | \$9,000 | 01/2013~03/2013**

**Title:** Open-ended IP R&D project (next-generation battery)

**Source:** Intellectual Discovery

**Role:** Principal Investigator

**Description:** (Classified)

**KITEP (2011-0022892) | \$540,000 | 04/2011~03/2012**

**Title:** Graduate student training project for developing new and renewable energy sources

**Source:** Korea Institute of Industrial Technology Evaluation and Planning

**Role:** Principal Investigator

**Description:** The goal of this project is to train graduate students for developing new and renewable energy sources.

**KBRA (2010-0022892) | \$108,000 | 03/2011~02/2014**

**Title:** Development of 3.6Ah class cylindrical lithium secondary battery technology

**Source:** Korea Battery Research Association

**Role:** Principal Investigator

**Description:** The goal of this project is to develop 3.6 Ah class cylindrical lithium secondary battery technology.

**KETEP (2010) | \$2,201,000 | 09/2010~08/2015**

**Title:** Graduate student training project for high-efficiency energy devices

**Source:** Korea Institute of Energy Technology Evaluation and Planning

**Role:** Co-Investigator

**Description:** The goal of this project is to train graduate students for developing high-efficiency energy devices.

**NRF (2010-0022892) | \$162,000 | 09/2010~08/2013**

**Title:** Study of electrochemical energy conversion characteristics of mesoporous nanoparticles using template-free synthesis method

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

**Description:** The goal of this project is to investigate electrochemical energy conversion characteristics of mesoporous nanoparticles using template-free synthesis method.

**NRF (2009-0093051/2011-0030335/2012M1A2A2671689) | \$552,000 | 09/2009~09/2015**

**Title:** New concept fuel cell using nitrogen cycle and Pt-free reduction reaction

**Source:** National Research Foundation of Korea

**Role:** Principal Investigator

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**Description:** The goal of this project is to develop new concept fuel cell using nitrogen cycle and Pt-free reduction reaction.

**KRF (2010-0065330) | \$97,000 | 05/2009~04/2011**

**Title:** Research on nanostructure control and stability of electrocatalysts using organic-inorganic composite materials

**Source:** Korea Research Foundation

**Role:** Principal Investigator

**Description:** The goal of this project is to train graduate students with nanotechnology in fuel cells.

**KIERTPE (200915500050) | \$234,000 | 03/2009~02/2012**

**Title:** Training of human resources with nanotechnology convergence for fuel cells

**Source:** Korea Institute of Energy Resources Technology Planning and Evaluation

**Role:** Principal Investigator

**Description:** The goal of this project is to train graduate students for nanotechnology in fuel cells.

**DEM (200917060166) | \$63,000 | 03/2009~02/2011**

**Title:** Research on synthesis and electrochemical properties of ultra-high capacity nano-cathode materials

**Source:** Daejeong EM Co., Ltd.

**Role:** Principal Investigator

**Description:** (Classified)

**KIAT (2009) | \$450,000 | 09/2009~02/2013**

**Title:** Graduate student training project for engine design and core control technology in high-performance fuel cell technology

**Source:** Korea Institute for Advancement of Technology

**Role:** Co-Investigator

**Description:** The goal of this project is to train human resources with engine design and core control technology in high-performance fuel cell technology.

**RDA (200814890027) | \$90,000 | 04/2008~12/2010**

**Title:** Bio-nano energy conversion system using fibrous biomass

**Source:** Rural Development Administration

**Role:** Principal Investigator

**Description:** The goal of this project is to develop bio-nano energy conversion system using fibrous biomass.

**KIST (2008-N-FC08-P-01-3-030) | \$90,000 | 08/2008~07/2011**

**Title:** Development of platinum-based catalyst by nano-shape structure control

**Source:** Korea Institute of Science and Technology

**Role:** Principal Investigator

**Description:** The goal of this project is to develop platinum-based catalysts by nano-shape structure control.

**Hyundai Motors (2008-N-FC12-J-01-2-100) | \$225,000 | 10/2008~07/2012**

**Title:** Support-catalyst interaction study to ensure MEA stability for hydrogen fuel cells

**Source:** Hyundai Motor Company Environmental Technology Research Center

**Role:** Principal Investigator

**Description:** (Classified)

**Hyundai Motor (200710800174) | \$27,000 | 01/2008~07/2008**

**Title:** Research on improving hydrogen fuel cell efficiency and durability using carbon-free nanoelectrodes

**Source:** Hyundai Motor Group NGV

**Role:** Principal Investigator

**Description:** (Classified)

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**KRF (200710590134) | \$21,700 | 08/2007~07/2008**



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**Title:** Development of platinum-based nanocatalyst structure for high-efficiency energy conversion device using electro-chemical energy

**Source:** Korea Research Foundation

**Role:** Principal Investigator

**Description:** The goal of this project is to develop platinum-based nanocatalyst structures for high-efficiency energy conversion devices using electro-chemical energy.

**KRF (200610590133) | \$39,600 | 11/2006~10/2007**

**Title:** Research on hydrogen ion-electron conductivity using electrochromic phenomenon in nano hybrid catalyst structure for hydrogen fuel cells

**Source:** Korea Research Foundation

**Role:** Principal Investigator

**Description:** The goal of this project is to understand hydrogen ion-electron conductivity using electrochromic phenomenon in nano hybrid catalyst structure for hydrogen fuel cells.

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## Teaching

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### Graduate Students Advised (as of 2024)

**56. Chan-Eui Hong, M.S.** Chemical Engineering, Soongsil University, 2022~2024

Thesis: Temperature-Controlled Shape Transformation of PtCo Alloy Catalysts for Enhanced Ammonia Oxidation in Anion-Exchange Membrane Direct Ammonia Fuel Cells

Current Position: To be updated

**55. So-Yeon Ahn, M.S.** Chemical Engineering, Soongsil University, 2022~2024

Thesis: F-doped Co-free  $\text{LiNi}_x\text{Mn}_{1-x}\text{O}_2$  Cathodes for Ameliorating Electrochemical Performance of Li-ion Batteries

Current Position: Samsung SDI R&D

**54. Yoonhi Gu, M.S.** Chemical Engineering, Soongsil University, 2022~2024

Thesis: NiFe layered double hydroxides synthesized based on solvent properties for enhanced oxygen evolution reaction in anion exchange membrane water electrolysis

Current Position: Korea Electronics Technology Institute (KETI)

**53. Da-Mi Lim, M.S.** Chemical Engineering, Soongsil University, 2022~2024

Thesis: 3D-stacked electrospun Fe-doped  $\text{NiCo}_2\text{O}_4$  nanofibers as integrated electrodes for oxygen evolution reaction

Current Position: Hyundai Motors R&D

**52. Seon-Ha Park, M.S.** Chemical Engineering, Soongsil University, 2022~2024

Thesis: Tri-doped mesoporous carbon nanostructures prepared via template method for enhanced oxygen reduction reaction

Current Position: Hyundai Steel R&D

**51. Won-Chan Kim, M.S.** Chemical Engineering, Soongsil University, 2022~2024

Thesis: Ameliorated Electrochemical Performance of Fe-doped  $\text{Li}_2\text{MnO}_3$  Cathodes for Li-ion Batteries

Current Position: Samsung SDI R&D

**50. Jeong-Hyeon Byeon, M.S.** Chemical Engineering, Soongsil University, 2021~2023

Thesis: Kirkendall effect-driven formation of hollow PtNi alloy nanostructures with enhanced oxygen reduction reaction performance

Current Position: LG Chemical R&D

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**49. Yu-Yeon Park, M.S.** Chemical Engineering, Soongsil University, 2021~2023

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Thesis: VN/rGO composite structure as an interlayer with dual lithium polysulfide adsorption effect for lithium-sulfur batteries

Current Position: LG Chemical R&D

**48. Min-Ha Kim, M.S.** Chemical Engineering, Soongsil University, 2021~2023

Thesis: Fe-doped Co<sub>3</sub>O<sub>4</sub> nanostructures prepared via hard-template method and used for the oxygen evolution reaction in alkaline media

Current Position: Hyundai Steel R&D

**47. Seong-Nam Lee, M.S.** Chemical Engineering, Soongsil University, 2021~2023

Thesis: Enhanced cycling performance of Fe-doped LiMn<sub>2</sub>O<sub>4</sub> truncated octahedral cathodes for Li-ion batteries

Current Position: LG Chemical R&D

**46. Hak Joo Lee, M.S.** Chemical Engineering, Soongsil University, 2020~2022

Thesis: Mesoporous Spinel Ir-doped NiCo<sub>2</sub>O<sub>4</sub> Nanostructure as an Efficient Catalyst for Oxygen Evolution Reaction

Current Position: Hyundai Motors R&D

**45. Woo-Jun Lee, M.S.** Chemical Engineering, Soongsil University, 2020~2022

Thesis: Enhanced oxygen reduction reaction performance of Pt catalysts on Nb<sub>2</sub>O<sub>5</sub> nanoparticles decorated carbon nanostructures

Current Position: Hyundai Motors R&D

**44. Jae-Hoon Shin, M.S.** Chemical Engineering, Soongsil University, 2020~2022

Thesis: Porous activated carbons derived from coffee waste for use as functional separators in lithium-sulfur batteries

Current Position: Ecopro BM R&D

**43. Sung-Beom Kim, M.S.** Chemical Engineering, Soongsil University, 2020~2022

Thesis: Li-ion diffusivity and electrochemical performance of high-nickel cathode material doped with fluoride ions

Current Position: SK ON R&D

**42. Sang-Hyun Moon, Ph.D.** Chemical Engineering, Soongsil University, 2017~2022

Thesis: A Study on the Optimization of functional separator and electrode structure for high stability lithium sulfur battery

Current Position: Korea Research Institute of Chemical Technology

**41. Jin-Hyeok Choi, M.S.** Chemical Engineering, Soongsil University, 2019~2021

Thesis: Enhanced electrochemical performance of MoS<sub>2</sub>/graphite nanosheet nanocomposites

Current Position: Ecopro BM R&D

**40. Seul-Gi Lee, M.S.** Chemical Engineering, Soongsil University, 2019~2021

Thesis: Effect of Sb-doped SnO<sub>2</sub> nanostructures on electrocatalytic performance of a Pt catalyst for methanol oxidation reaction

Current Position: Ecopro BM R&D

**39. Yo-Seob Kim, M.S.** Chemical Engineering, Soongsil University, 2018~2020

Thesis: Ni<sub>2</sub>P/graphitic carbon nanostructure electrode with superior electrochemical performance

Current Position: Samsung SDI R&D

**38. Hyeona Kim, M.S.** Chemical Engineering, Soongsil University, 2018~2020

Thesis: Facile one-pot synthesis of Ge/TiO<sub>2</sub> nanocomposite materials with improved electrochemical performance

Current Position: SK ON R&D

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- 37. Min-Cheol Kim, Ph.D.** Chemical Engineering, Soongsil University, 2014~2019  
Thesis: A study on the optimization of cathode catalyst and gas diffusion layer structure for high performance lithium air batteries  
Current Position: Dongsung Chemical R&D
- 36. Suk-Hui Kwon, M.S.** Chemical Engineering, Soongsil University, 2017~2019  
Thesis: Synergistically enhanced electrocatalytic stability of Pt catalyst supported by doped porous carbon nanostructure  
Current Position: Hyundai Motors R&D
- 35. Ji-Eun Lee, M.S.** Chemical Engineering, Soongsil University, 2017~2019  
Thesis: Role of polyvinylpyrrolidone in electrochemical performance of Li<sub>2</sub>MnO<sub>3</sub> cathode for lithium-ion batteries  
Current Position: Hyundai Mobis R&D
- 34. Yeon-Kyung Shin, M.S.** Chemical Engineering, Soongsil University, 2017~2019  
Thesis: Pore-controlled polymer membrane with Mn(II) ion trapping effect for high-rate performance LiMn<sub>2</sub>O<sub>4</sub> cathode  
Current Position: Samsung SDI R&D
- 33. Sojeong Cho, M.S.** Chemical Engineering, Soongsil University, 2017~2019  
Thesis: F-doped Li<sub>1.15</sub>Ni<sub>0.275</sub>Ru<sub>0.575</sub>O<sub>2</sub> cathode materials with long cycle life and improved rate performance  
Current Position: LG Chemical R&D
- 32. Eun-Soo Kim, M.S.** Chemical Engineering, Soongsil University, 2017~2019  
Thesis: Surface modified and size-controlled octahedral Cu<sub>2</sub>O nanostructured electrodes for lithium-ion batteries  
Current Position: SK Hynix
- 31. Ji-Eun Won, M.S.** Chemical Engineering, Soongsil University, 2016~2018  
Thesis: PtIr/Ti<sub>4</sub>O<sub>7</sub> as a bifunctional electrocatalyst for improved oxygen reduction and oxygen evolution reactions  
Current Position: To be updated
- 30. Kyeng-Bae Ma, M.S.** Chemical Engineering, Soongsil University, 2016~2018  
Thesis: Direct ethanol fuel cells with superior methanol-tolerant non-precious metal cathode catalysts for oxygen reduction reaction  
Current Position: KT&G R&D
- 29. Do-Hyoung Kim, M.S.** Chemical Engineering, Soongsil University, 2016~2018  
Thesis: The role of arginine as nitrogen doping and carbon source for enhanced oxygen reduction reaction  
Current Position: Samsung Electronics
- 28. Da-Hee Kwak, Ph.D.** Chemical Engineering, Soongsil University, 2013~2018  
Thesis: Study on Doped Mesoporous Carbon Nanostructures as Non-Precious Metal Catalysts for Oxygen Reduction Reaction  
Award: Samsung Human Tech Paper Award, Samsung Electronics, 2015  
Current Position: Hyundai Motors R&D
- 27. Jin-Young Park, M.S.** Chemical Engineering, Soongsil University, 2016~2018  
Thesis: Organic ligand-free PtIr alloy nanostructures for superior oxygen reduction and evolution reactions  
Current Position: Doosan DMI R&D
- 26. Hyun-Suk Park, M.S.** Chemical Engineering, Soongsil University, 2015~2017  
Thesis: Sulfur-doped porphyrinic carbon nanostructures synthesized by amorphous MoS<sub>2</sub> for oxygen reduction reaction in an acid medium
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Current Position: Boyaz Energy R&D

**25. Sang-Beom Han, Ph.D.** Chemical Engineering, Soongsil University, 2010~2017

Thesis: The Chemically Regenerative redox fuel cells via liquid-catalyst without precious metals

Award: Seoul Fellowship, Seoul Scholarship Foundation, 2009

Current Position: CTO, Boyaz Energy

**24. Hui-Seon Choe, M.S.** Chemical Engineering, Soongsil University, 2015~2017

Thesis: In-situ synthesis of Ge/Ti4O7 composite with enhanced electrochemical properties

Current Position: Samsung SDI R&D

**23. In-Ae Choi, M.S.** Chemical Engineering, Soongsil University, 2015~2017

Thesis: Doped porous carbon nanostructures as non-precious metal catalysts prepared by amino acid glycine for oxygen reduction reaction

Current Position: Samsung SDI R&D

**22. Gyu-Ho Lee, M.S.** Chemical Engineering, Soongsil University, 2015~2017

Thesis: Synthesis of Ge/C composites as anodes using glucose as a reductant and carbon source for lithium-ion batteries

Current Position: Ottogi Co. R&D

**21. Si-Jin Kim, Ph.D.** Chemical Engineering, Soongsil University, 2011~2017

Thesis: Synthesis of high-capacity electrode materials (Li2MnO3 based, Si based) for Li-ion batteries and their electrochemical performance

Award: Material Popularization Contest Award, Materials Research Institute, S. Korea, 2016

Current Position: National Research Foundation of Korea

**20. Jin-Yeon Lee, M.S.** Chemical Engineering, Soongsil University, 2014~2016

Thesis: Porous Cu-rich@Cu3Pt alloy catalyst with a low Pt loading for enhanced electrocatalytic reactions

Current Position: Korea Institute of Industrial Technology

**19. Seul Lee, M.S.** Chemical Engineering, Soongsil University, 2014~2016

Thesis: Bimodal porous iron-nitrogen doped highly crystalline carbon nanostructure as a cathode catalyst for oxygen reduction reaction in an acid medium

Current Position: Samsung Electronics

**18. Da-Mi Kim, M.S.** Chemical Engineering, Soongsil University, 2014~2016

Thesis: In-Situ Synthesis and Characterization of Ge Embedded Electrospun Carbon Nanostructures as High Performance Anode Material for Lithium-Ion Batteries

Current Position: Samsung Electronics

**17. Eui-Tak Hwang, M.S.** Chemical Engineering, Soongsil University, 2013~2015

Thesis: Synthesis of Pt-Rich@Pt-Ni alloy core-shell nanoparticles using halides

Current Position: FITI Testing & Research Institute

**16. Han-Chul Park, M.S.** Chemical Engineering, Soongsil University, 2013~2015

Thesis: Tungsten nitride nanoplates as an anode material for lithium ion batteries

Current Position: Youl Chon Chemical Co. R&D

**15. Young-Woo Lee, Ph.D.** Chemical Engineering, Soongsil University, 2009~2014

Thesis: Synthesis of Shape- and Structure-Controlled Pt-based Nanocatalysts for Electrochemical Catalytic Reactions

Award: H. H. Dow Memorial Student Achievement Award, The Electrochemical Society, US, 2013

Current Position: Professor, Soonchunhyang University, S. Korea

**14. Bo-Mi Hwang, M.S.** Chemical Engineering, Soongsil University, 2012~2014

Thesis: Truncated octahedral LiMn2O4 cathode for high-performance lithium-ion batteries

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Current Position: EMW Co. R&D

**13. Kyung-Hoon Lee, M.S.** Chemical Engineering, Soongsil University, 2012~2014  
Thesis: Single-crystalline mesoporous Mo<sub>2</sub>N nanobelts with an enhanced electrocatalytic activity for oxygen reduction reaction

Current Position: Samsun Electronics

**12. Ah-Reum Park, M.S.** Chemical Engineering, Soongsil University, 2012~2014  
Thesis: Enhanced electrocatalytic activity and stability of PdCo@Pt core-shell nanoparticles for oxygen reduction reaction

Current Position: HnPower

**11. Je-Suk Moon, M.S.** Chemical Engineering, Soongsil University, 2012~2014  
Thesis: Iron-nitrogen-doped mesoporous tungsten carbide nanostructures as an oxygen reduction electrocatalyst

Award: Samsung Human Tech Paper Award, Samsung Electronics, 2013

Current Position: Samsun Electronics

**10. Biao Han, M.S.** Chemical Engineering, Soongsil University, 2011~2013  
Thesis: Single crystalline rutile TiO<sub>2</sub>-NWs for improved lithium-ion intercalation properties

Current Position: SoulBrain Co. Ltd.

**9. Seong-Bae Kim, Ph.D.** Chemical Engineering, Soongsil University, 2009~2013  
Thesis: Development of multi-component cathode materials for lithium secondary batteries

Current Position: LG Chemical

**8. Do-Young Kim, M.S.** Chemical Engineering, Soongsil University, 2010~2012  
Thesis: TiO<sub>2</sub>@C core-shell nanostructure electrodes for improved electrochemical properties in alkaline solution

Current Position: NOROO Holdings R&D

**7. A-Ra Ko, M.S.** Chemical Engineering, Soongsil University, 2009~2011  
Thesis: Synergy Effect of Nanostructure Electrodes Supported by Tungsten Carbide and Oxide for Methanol Electrooxidation

Current Position: To be updated

**6. Hyun-Su Kim, M.S.** Chemical Engineering, Soongsil University, 2009~2011  
Thesis: Controlled nanostructure electrodes for dye-sensitized solar cells

Current Position: To be updated

**5. Jong-Min Lee, M.S.** Chemical Engineering, Soongsil University, 2008~2010  
Thesis: Core-Shell Nanostructure Electrodes for Improved Electrocatalytic Properties in Methanol Electrooxidation

Current Position: LG Chemical

**4. Jy-Yeon Kim, M.S.** Chemical Engineering, Soongsil University, 2008~2010  
Thesis: Improved Tri-iodide Reduction Reaction of Co-TMPP/C as a Non-Pt Counter Electrode in Dye-Sensitized Solar Cells

Current Position: PICOSTECH Co. Ltd.

**3. Jae-Kyung Oh, M.S.** Chemical Engineering, Soongsil University, 2008~2010  
Thesis: TiO<sub>2</sub> Nano branch electrodes synthesized by seeding method for dye-sensitized solar cells

Current Position: Hyundai Motors R&D

**2. Jin-Kyu Lee, M.S.** Chemical Engineering, Soongsil University, 2007~2009  
Thesis: Synthesis of TiO<sub>2</sub> nanoparticles via hydrothermal process for dye-sensitized solar cells

Current Position: SGE Co. Ltd.

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**1. You-Jung Song, M.S.** Chemical Engineering, Soongsil University, 2007~2009  
Thesis: Synthesis of Pd Dendritic Nanowires by Electrochemical Deposition  
Current Position: Hyundai Motors R&D

### Current Graduate Students (as of 2024)

**1. Deok-Hye Park, Ph.D.** Student, Chemical Engineering, Soongsil University, 2019~present  
Research Interest: Electrochemical Water Electrolysis

**2. Ji-Hwan Kim, Ph.D.** Student, Chemical Engineering, Soongsil University, 2020~present  
Research Interest: Electrolytes for All-Solid-State Batteries

**3. Jae-Sung Jang, Ph.D.** Student, Chemical Engineering, Soongsil University, 2020~present  
Research Interest: Li-Air Batteries

**4. Dong-Geon Seo, M.S.** Student, Chemical Engineering, Soongsil University, 2023~present  
Research Interest: Pt-based Catalysts for Proton Exchange Membrane Fuel Cells and Water Electrolysis

**5. Gang-In Lee, M.S.** Student, Chemical Engineering, Soongsil University, 2023~present  
Research Interest: Cathode for Li-S Batteries

**6. Jong-Won Lim, M.S.** Student, Chemical Engineering, Soongsil University, 2023~present  
Research Interest: Cathode for Li-ion Batteries

**7. Jae-Ik Han, M.S.** Student, Chemical Engineering, Soongsil University, 2023~present  
Research Interest: Anode Catalysts for Proton Exchange Water Electrolysis

**8. Ji-Min Hong, M.S.** Student, Chemical Engineering, Soongsil University, 2023~present  
Research Interest: Oxide Electrolytes for All-Solid-State Batteries

**9. Ji-Min Hong, M.S.** Student, Chemical Engineering, Soongsil University, 2023~present  
Research Interest: Oxide Electrolytes for All-Solid-State Batteries

**10. Eo-Jin Kim, M.S.** Student, Chemical Engineering, Soongsil University, 2024~present  
Research Interest: Proton Exchange Membrane Water Electrolysis

**11. Hyun-Moon Jo, M.S.** Student, Chemical Engineering, Soongsil University, 2024~present  
Research Interest: Alkaline Exchange Membrane Water Electrolysis

**12. Min-Jae Kim, M.S.** Student, Chemical Engineering, Soongsil University, 2024~present  
Research Interest: Oxide Electrolytes for All-Solid-State Batteries

**13. Se-Yeon Jang, M.S.** Student, Chemical Engineering, Soongsil University, 2024~present  
Research Interest: Cathode for Li-ion Batteries

**14. Ji-Woong Yun, M.S.** Student, Chemical Engineering, Soongsil University, 2024~present  
Research Interest: Proton Exchange Membrane Water Electrolysis

**15. Chae-Won Cho, M.S.** Student, Chemical Engineering, Soongsil University, 2024~present  
Research Interest: Proton Exchange Membrane Water Electrolysis

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## Courses Taught

Instructor, **Industry/Academia-Linked Hydrogen Energy**, Graduate Course, Soongsil University, 2024  
 Instructor, **Hydrogen Production: Electrochemistry**, Graduate Course, Soongsil University, 2024  
 Instructor, **Electrochemical Energy Engineering**, Undergrad Elective, Soongsil University, 2024  
 Instructor, **Advanced Battery Engineering**, Undergrad Elective, Soongsil University, 2023 / 2024  
 Instructor, **Nanomaterials Engineering**, Undergrad Elective, Soongsil University, 2022 / 2023  
 Instructor, **Hydrogen Energy Applications**, Graduate Course, Soongsil University, 2022  
 Instructor, **Understanding Scientific Papers**, Graduate Course, Soongsil University, 2022  
 Instructor, **Electrochemical Engineering**, Undergrad Elective, Soongsil University, 2021 / 2022  
 Instructor, **Nano Application Engineering**, Graduate Course, Soongsil University, 2021  
 Instructor, **Instrument analysis**, Undergrad Elective, Soongsil University, 2020~2024  
 Instructor, **Energy Device Engineering**, Undergrad Elective, Soongsil University, 2020 / 2022  
 Instructor, **Energy Materials Science**, Graduate Course, Soongsil University, 2017  
 Instructor, **Chemical Engineering Thermodynamics II**, Undergrad Elective, Soongsil University, 2014~2018 / 2020  
 Instructor, **Engineering Design**, Undergrad Elective, Soongsil University, 2013~2015  
 Instructor, **Introduction to Electrochemical Engineering**, Graduate Course, Soongsil University, 2013  
 Instructor, **Energy Materials**, Undergrad Elective, Soongsil University, 2013 / 2017  
 Instructor, **Special Topics on Energy Conversion**, Graduate Course, Soongsil University, 2013  
 Instructor, **Special Topics on Secondary Batteries**, Graduate Course, Soongsil University, 2012  
 Instructor, **Nano Device Engineering**, Undergrad Elective, Soongsil University, 2009~2011 / 2018 / 2022  
 Instructor, **Chemical Engineering Thermodynamics I**, Core Engineering Course, Soongsil University, 2008 / 2009 / 2014~2018 / 2020 / 2021  
 Instructor, **Introduction to Engineering Design**, Undergrad Elective, Soongsil University, 2007 / 2012  
 Instructor, **Energy Engineering**, Graduate Course, Soongsil University, 2007  
 Instructor, **Inorganic Chemistry**, Undergrad Elective, Soongsil University, 2007  
 Instructor, **Physical Chemistry**, Core Engineering Course, Soongsil University, 2006  
 Instructor, **Materials Science**, Undergrad Elective, Soongsil University, 2006~2008 / 2010 / 2013 / 2014  
 Instructor, **Introduction to Nanotechnology**, Graduate Course, Soongsil University, 2005  
 Instructor, **Engineering Mathematics**, Undergrad Elective, Soongsil University, 2005~2007

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## Publications

### Representative SCI Papers (\*Corresponding author)

**[All-Solid-State Batteries]** "Heterogeneous Double-Layered Hybrid Solid Electrolyte with a Concentration-Gradient Structure for High-Performance All-Solid-State Li Batteries", Ji-Hwan Kim, Ji-Won Sun, Jae-Sung Jang, Deok-Hye Park, So-Yeon Ahn, Won-Chan Kim, Kyoungmin Min\*, **Kyung-Won Park\***, *Energy Storage Materials* 64 (2024) 103080

**[High-Capacity Cathode for Li-ion Batteries]** "Ameliorated Electrochemical Performance of Fe-doped Li<sub>2</sub>MnO<sub>3</sub> Cathodes for Li-ion Batteries", Won-Chan Kim, Ji-Hwan Kim, Juo Kim, Deok-Hye Park, Yu-Yeon Park, Jae-Sung Jang, So-Yeon Ahn, Kyoungmin Min\*, Kyung-Won Park\*, *Journal of Materials Chemistry A* 12 (2024) 1135-1144

**[Advanced Water Electrolysis for Hydrogen Production]** "Lithium-ion exchange membrane water electrolysis using a cationic polymer-modified polyethersulfone membrane", Yong-Soo Lee, Deok-Hye Park, Seon-Ha Park, Yun-Hui Gu, Da-Mi Lim, Sang-Beom Han, **Kyung-Won Park\***, *ACS Sustainable Chemistry & Engineering*, 11(27) (2023) 10183-10190

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**[Andoe Catalyst for Water Electrolysis]** “Spherical nickel doped cobalt phosphide as an anode catalyst for oxygen evolution reaction in alkaline media: From catalysis to system”, Deok-Hye Park, Min-Ha Kim, Myungjae Kim, Jeong-Hyeon Byeon, Jae-Sung Jang, Ji-Hwan Kim, Da-Mi Lim, Seon-Ha Park, Yun-Hui Gu, Jiwoong Kim, **Kyung-Won Park\***, *Applied Catalysis B*, 327 (2023) 122444

**[Li-Air Batteries]** “Nature Inspired Cathodes using High-density Carbon Papers with Eddy Current Effect for High-rate Performance Li-air Batteries”, Min-Cheol Kim, Jin-Young So, Sang-Hyun Moon, Sang-Beom Han, Sojeong Choi, Eun-Soo Kim, Yeon-Kyung Shin, Ji-Eun Lee, Da-Hee Kwak, Chanho Lee, Won-Gyu Bae, and **Kyung-Won Park\***, *Journal of Materials Chemistry A*, 6 (2018) 9550-9560

**[Fuel Cells using Redox/Regeneration Reactions]** “High-Performance Chemically Regenerative Redox Fuel Cells using a NO<sub>3</sub>-/NO Regeneration Reaction”, Sang-Beom Han, Da-Hee Kwak, Hyun Suk Park, In-Ae Choi, Jin-Young Park, Si-Jin Kim, Min-Cheol Kim, Seongho Hong, and **Kyung-Won Park\***, *Angewandte Chemie International Edition*, 56 (2017) 2893-2897.

**[Non-Pt Catalyst for Electrochemical Oxygen Reduction]** “Fe/N/S-doped mesoporous carbon nanostructures as electrocatalyst for oxygen reduction reaction in acid medium”, Da-Hee Kwak, Sang-Beom Han, Y.-W. Lee, Hyun-Suk Park, In-Ae Choi, Min-Cheol Kim, Si-Jin Kim, Do-Hyoung Kim, Jung Inn Sohn, **Kyung-Won Park\***, *Applied Catalysis B*, 203 (2017) 889-898.

**[Nanostructured Anode for Li-ion Batteries]** “3D flexible Si based-composite(Si@Si<sub>3</sub>N<sub>4</sub>)/CNF electrode with enhanced cyclability and high rate capability for lithium-ion batteries”, Si-Jin Kim, Min-Cheol Kim, Sang-Beom Han, Gyu-Ho Lee, Hui-Seon Choe, Da-Hee Kwak, Sun-Yong Choi, Byung-Goo Son, Myoung-Sun Shin, **Kyung-Won Park\***, *Nano Energy*, 27 (2016) 545-553.

**[Fuel Cells using Redox Couple]** “Chemically regenerative redox fuel cells using iron redox couple as a liquid catalyst with co-catalysts”, Sang-Beom Han, Da-Hee Kwak, Hyun Suk Park, In-Ae Choi, Jin-Young Park, Kyeng-Bae Ma, Ji-Eun Won, Do-Hyoung Kim, Si-Jin Kim, Min-Cheol Kim, and **Kyung-Won Park\***, *ACS Catalysis*, 6 (2016) 5302-5306.

## Total Journal Articles (Citations 10816, H-index 53, as of January 2025)

1. "Electrospun Fe-ZIF Derived Carbon Nanofibers for Boosting Adsorption and Redox Kinetics of Polysulfides in Lithium Sulfur Batteries", Gang-In Lee, Deok-Hye Park, Ji-Hwan Kim, Jae-Sung Jang, So-Yeon Ahn, Young-Kwang Kim, Jong-Won Lim, Ji-Min Hong, Se-Jun Park, Min-Jae Kim, Se-Yeon Jang, **Kyung-Won Park\***, *Journal of Materials Chemistry A*, (2025) in press
  2. "Promoting Hydrogen Evolution Reaction in Acidic and Neutral Conditions on Co-Based Ternary Electrocatalyst: Enhancing Catalytic Activity via Electrochemical Oxidation", Soyeon Lim, Deok-Hye Park, Hyewon Jin, Jaeyeon Park, Yeosol Yoon, Soo-Kil Kim, **Kyung-Won Park\***, **Taeho Lim\***, *ACS Applied Energy Materials*, 7(24) (2024) 11929-11936
  3. "3D-stacked electrospun Fe-doped NiCo<sub>2</sub>O<sub>4</sub> nanofibers as integrated electrodes for oxygen evolution reaction", Da-Mi Lim, Deok-Hye Park, Min-Ha Kim, Jeong-Hyeon Byeon, Yoonhi Gu, Seon-Ha Park, Ji-Hwan Kim, Jae-Sung Jang, Chan-Eui Hong, Jae-Ik Han, Dong-Geon Seo, Kyung-Won Park, *Applied Materials Today* 41 (2024) 102502
  4. "Temperature-Controlled Shape Transformation of PtCo Alloy Catalysts for Enhanced Ammonia Oxidation in Anion-Exchange Membrane Direct Ammonia Fuel Cells", Chan-Eui Hong, Deok-Hye Park, Yoonhi Gu, Seon-Ha Park, Da-Mi Lim, Dong-Geon Seo, Jae-Ik Han, **Kyung-Won Park\***, *International Journal of Hydrogen Energy* 87 (2024) 1367-1376
  5. "F-doped Co-free LiNi<sub>x</sub>Mn<sub>1-x</sub>O<sub>2</sub> (0.7 ≤ x ≤ 0.9) Cathodes for Ameliorating Electrochemical Performance of Li-ion Batteries", So-Yeon Ahn, Deok-Hye Park, Ji-Hwan Kim, Jae-Sung Jang, Won-Chan Kim, Gang-In Lee, Jong-Won Lim, Ji-Min Hong, **Kyung-Won Park\***, *Materials Today*
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*Energy* 41 (2024) 101520

6. "Ameliorated Electrochemical Performance of Fe-doped Li<sub>2</sub>MnO<sub>3</sub> Cathodes for Li-ion Batteries", Won-Chan Kim, Ji-Hwan Kim, Joo Kim, Deok-Hye Park, Yu-Yeon Park, Jae-Sung Jang, So-Yeon Ahn, Kyoungmin Min\*, **Kyung-Won Park\***, *Journal of Materials Chemistry A* 12 (2024) 1135-1144
  7. "NiFe layered double hydroxides synthesized based on solvent properties for enhanced oxygen evolution reaction in anion exchange membrane water electrolysis", Yoonhi Gu, Deok-Hye Park, Min-Ha Kim, Jeong-Hyeon Byeon, Da-Mi Lim, Seon-Ha Park, Ji-Hwan Kim, Jae-Sung Jang, **Kyung-Won Park\***, *Chemical Engineering Journal*, 480 (2024) 147789
  8. "Tri-doped mesoporous carbon nanostructures prepared via template method for enhanced oxygen reduction reaction", Seon-Ha Park, Deok-Hye Park, Jeong-Hyeon Byeon, Min-Ha Kim, Yoonhi Gu, Da-Mi Lim, Ji-Hwan Kim, Jae-Sung Jang, Chan-Eui Hong, Dong-Geon Seo, Jae-Ik Han, **Kyung-Won Park\***, *Carbon* 218 (2024) 118666
  9. "Heterogeneous Double-Layered Hybrid Solid Electrolyte with a Concentration-Gradient Structure for High-Performance All-Solid-State Li Batteries", Ji-Hwan Kim, Ji-Won Sun, Jae-Sung Jang, Deok-Hye Park, So-Yeon Ahn, Won-Chan Kim, Kyoungmin Min\*, **Kyung-Won Park\***, *Energy Storage Materials* 64 (2024) 103080
  10. "VN/rGO composite structure as an interlayer with dual lithium polysulfide adsorption effect for lithium-sulfur batteries", Yu-Yeon Park, Sang-Hyun Moon, Deok-Hye Park, Jae-Hoon Shin, Ji-Hwan Kim, Jae-Sung Jang, Sung-Beom Kim, Sung-Nam Lee, **Kyung-Won Park\***, *Journal of Alloys and Compounds* 960 (2023) 170812
  11. "Lithium-ion exchange membrane water electrolysis using a cationic polymer-modified polyethersulfone membrane", Yong-Soo Lee, Deok-Hye Park, Seon-Ha Park, Yun-Hui Gu, Da-Mi Lim, Sang-Beom Han, **Kyung-Won Park\***, *ACS Sustainable Chemistry & Engineering*, 11(27) (2023) 10183-10190
  12. "Fe-doped Co<sub>3</sub>O<sub>4</sub> nanostructures prepared via hard-template method and used for the oxygen evolution reaction in alkaline media", Min-Ha Kim, Deok-hye Park, Jeong-Hyeon Byeon, Da-Mi Lim, Yun-Hui Gu, Seon-Ha Park, **Kyung-Won Park\***, *Journal of Industrial Engineering and Chemistry*, 123 (2023) 436-446
  13. "Spherical nickel doped cobalt phosphide as an anode catalyst for oxygen evolution reaction in alkaline media: From catalysis to system", Deok-Hye Park, Min-Ha Kim, Myungjae Kim, Jeong-Hyeon Byeon, Jae-Sung Jang, Ji-Hwan Kim, Da-Mi Lim, Seon-Ha Park, Yun-Hui Gu, Jiwoong Kim\*, **Kyung-Won Park\***, *Applied Catalysis B*, 327 (2023) 122444
  14. "Enhanced oxygen reduction reaction performance of Pt catalysts on Nb<sub>2</sub>O<sub>5</sub> nanoparticles decorated carbon nanostructures", Woo-Jun Lee, Deok-Hye Park, Hak-Joo Lee, Jeong-Hyeon Byeon, Min-Ha Kim, and **Kyung-Won Park\***, *Materials Science and Engineering B* 289 (2023) 116253
  15. "Kirkendall effect-driven formation of hollow PtNi alloy nanostructures with enhanced oxygen reduction reaction performance", Jeong-Hyeon Byeon, Deok-Hye Park, Woo-Jun Lee, Min-Ha Kim, Hak-Joo Lee, **Kyung-Won Park\***, *Journal of Power Sources*, 556 (2023) 232483
  16. "Solvothermal synthesis-driven quaternary Ni-rich cathode for stability-improved Li-ion batteries", Sung-Beom Kim, So-Yeon Ahn, Ji-Hwan Kim, Jae-Sung Jang, **Kyung-Won Park\***, *Electrochemistry Communications*, 146 (2023) 107426
  17. "Development of a lithium-air battery with an improved redox mediator applicable to gel polymer electrolytes", Jae-Sung Jang, Min-Cheol Kim, Ji-Hwan Kim, Deok-Hye Park, Seong-Nam Lee, Yu-Yeon Park, Min-Ha Kim, Jeong-Hyeon Byeon, Jung, Inn Sohn, **Kyung-Won Park\***, *Journal of*
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*Industrial Engineering Chemistry* 117 (2023) 220-226

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18. "Porous activated carbons derived from coffee waste for use as functional separators in lithium-sulfur batteries", Jae-Hoon Shin, Yu-Yeon Park, Sang-Hyun Moon, Ji-Hwan Kim, Jae-Sung Jang, Sung-Beom Kim, Sung-Nam Lee, **Kyung-Won Park\***, *Energies* 15 (2022) 7961
  19. "High-performance free-standing hybrid solid electrolyte membrane combined with  $\text{Li}_6\text{.28Al}_0\text{.24La}_3\text{Zr}_2\text{O}_{12}$  and hexagonal-BN for all-solid-state lithium-based batteries", Ji-Hwan Kim, Deok-Hye Park, Jae-Sung Jang, Jae-Hoon Shin, Min-Cheol Kim, Sung-Beom Kim, Sang-Hyun Moon, Seong-Nam Lee, **Kyung-Won Park\***, *Chemical Engineering Journal* 446(2) (2022) 137035
  20. "Polypyrrole coated g-C<sub>3</sub>N<sub>4</sub>/rGO/S composite as sulfur host for high stability lithium-sulfur batteries", Sang-Hyun Moon, Jae-Hoon Shin, Ji-Hwan Kim, Jae-Sung Jang, Sung-Beom Kim, Yu-Yeon Park, Seong-Nam Lee, **Kyung-Won Park\***, *Mater Chem Phys* 287 (2022) 126267
  21. "Multifunctional Catalytic Porous Transport Layer Integrated with Chalcogen Compound for High-Performance Electrochemical Energy Devices", Min-Cheol Kim, Seunghwan Jo, Jaesung Jang, Yong-Soo Lee, Sang-Beom Han, Kyung-Won Park and Jung Inn Sohn, *Applied Surface Science* 590 (2022) 153030
  22. "Enhanced cycling performance of Fe-doped  $\text{LiMn}_2\text{O}_4$  truncated octahedral cathodes for Li-ion batteries", Seong-Nam Lee, Sang-Hyun Moon, Deok-Hye Park, Ji-Hwan Kim, Jae-Sung Jang, Sung-Beom Kim, Jae-Hun Shin, Yu-Yeon Park, **Kyung-Won Park\***, *ChemElectroChem* 9(11) (2022) e202200385
  23. "Highly Efficient Lithium-ion Exchange Membrane Water Electrolysis", Yong-Soo Lee, Yong-Hwan Mo, Deok-Hye Park, Woo-Jun Lee, Hak Joo Lee, Hyun-Suk Park, Sang-Beom Han, **Kyung-Won Park\***, *Journal Power Sources*, 529 (2022) 231188
  24. "High absorption and fast polysulfides conversion of dual functional separator based on mesoporous-WC/rGO composite for lithium-sulfur batteries", Sang-Hyun Moon, Ji-Hwan Kim, Jae-Hoon Shin, Jae-Sung Jang, Sung-Beom Kim, Seong-Nam Lee, Suk-Hui Kwon, **Kyung-Won Park\***, *Journal Alloys and Compounds*, 904 (2022) 164120
  25. "New Highly Stable Ionic Compounds Composed of Multivalent Graphene Quantum Dot Anions and Alkali Metal Cations", Hong-Chul Lim, Min-Chul Kim, Ayoung Kim, Eunji Park, Yunjae Park, Rakwoo Chang, Jong-In Hong, **Kyung-Won Park\***, Ik-Soo Shin\*, Hansu Kim\*, *Batteries & Supercaps*, (2022) e202100337
  26. "Development of Ni-Ir oxide composites as oxygen catalysts for an anion-exchange membrane water electrolyzer", Deok-Hye Park, Min-Ha Kim, Hak-Joo Lee, Woo-Jun Lee, Jeong-Hyeon Byeon, Ji-Hwan Kim, Jae-Sung Jang, **Kyung-Won Park\***, *Advanced Materials Interfaces*, (2022) 2102063
  27. "Coffee waste-derived one-step synthesis of a composite structure with Ge nanoparticles surrounded by amorphous carbon for Li-ion batteries", Jae-Hoon Shin, Deok-Hye Park, Woo-Jun Lee, Sang-Hyun Moon, Jin-Hyeok Choi, Ji-Hwan Kim, Jae-Sung Jang, Sung-Beom Kim, **Kyung-Won Park\***, *Journal of Alloys and Compounds* 889 (2021) 161685
  28. "Mesoporous Spinel Ir-doped  $\text{NiCo}_2\text{O}_4$  Nanostructure as an Efficient Catalyst for Oxygen Evolution Reaction" Hak Joo Lee, Deok-Hye Park, Woo-Jun Lee, Sang-Beom Han, Min-Ha Kim, Jeong-Hyeon Byeon, **Kyung-Won Park\***, *Applied Catalysis A* 626 (2021) 118377
  29. "Enhanced electrochemical performance of a selectively formed  $\text{V}_2\text{O}_3/\text{C}$  composite structure for Li-ion batteries", Ji-Hwan Kim, Yo-Seob Kim, Sang-Hyun Moon, Min-Cheol Kim, Jin-Hyeok Choi, Deok-Hye Park, Jae-Hoon Shin, **Kyung-Won Park\***, *Electrochimica Acta*, 389 (2021) 138685
  30. "Li-ion diffusivity and electrochemical performance of high-nickel cathode material doped with
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- fluoride ions", Sung-Beom Kim, Hyeona Kim, Deok-Hye Park, Ji-Hwan Kim, Jae-Hoon Shin, Jae-Sung Jang, Sang-Hyun Moon, Jin-Hyuk Choi, **Kyung-Won Park\***, *Journal of Power Sources*, 506 (2021) 230219
31. "Top-down preparation of Ni-Pd-P@graphitic carbon core-shell nanostructure for electrocatalytic reactions", Deok-Hye Park, Yo-Seob Kim, Sang-Beom Han, Woo-Jun Lee, Hak-Joo Lee, Yong-Soo Lee, Sang-Hyun Moon, **Kyung-Won Park\***, *International Journal of Hydrogen Energy*, 46 (2021) 22499-22507
  32. "Synergistically enhanced electrocatalytic stability of Pt catalyst supported by doped porous carbon nanostructure", Suk-Hui Kwon, Seul-Gi Lee, Sang-Beom Han, **Kyung-Won Park\***, *Electrocatalysis* 11(5) (2021) 497-504
  33. "1T-MoS<sub>2</sub>/carbon nanofiber composite as an interlayer fabricated by an in situ electrochemical fabrication method for lithium-sulfur batteries", Sang-Hyun Moon, Min-Cheol Kim, Hyeona Kim, Yo-Seob Kim, Jin-Hyeok Choi, **Kyung-Won Park\***, *Journal of Alloys Compounds* 857 (2020) 158236
  34. "Synthesis of highly conductive titanium suboxide support materials with superior electrochemical durability for proton exchange membrane fuel cells", Min-Cheol Kim, Namchul Cho, Tae Jun Kang, Nguyen The Manh, Young-Woo Lee, Kyung-Won Park, *Molecular Crystals and Liquid Crystals*, 707(1) (2020) 110–117
  35. "Antioxidant activity of hydrogen water mask pack composed of gel-type emulsion and hydrogen generation powder", Hye-Jin Kwon, Sang-Beom Han, **Kyung-Won Park\***, *International Journal of Molecular Sciences*, 21(24) (2020) 9731
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216. “Methanol Oxidation on Pt/Ru, Pt/Ni and Pt/Ru/Ni Anode Electrocatalysts at Different Temperature For Direct Methanol Fuel Cells” Jong-Ho Choi, **Kyung-Won Park**, Boo-Kil Kwon, Yung-Eun Sung, *Journal of The Electrochemical Society*, 150(7) (2003) 973-978.
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218. “Pt-WO<sub>x</sub> electrode structure for thin film fuel cells” **Kyung-Won Park**, Kwang-Soon Ahn, Jong-Ho Choi, Yoon-Chae Nah, Young-Min Kim, Yung-Eun Sung, *Applied Physics Letters*, 81(5) (2002) 907-909.
219. “Chemical and Electronic Effects of Ni in Pt/Ni and Pt/Ru/Ni Alloy Nanoparticles in Methanol Electrooxidation” **Kyung-Won Park**, Jong-Ho Choi, Boo-Kil Kwon, Seol-Ah Lee, Yung-Eun Sung, H.-Y. Ha, S.-A. Hong, H. Kim, A. Wieckowski, *Journal of Physical Chemistry B*, 106(8) (2002) 1869-1877.
220. “New Diffusion Layer using RuO<sub>2</sub> and Carbon - RuO<sub>2</sub> Composites for Direct Methanol Fuel Cell” **Kyung-Won Park**, Boo-Kil Kwon, Jong-Ho Choi, In-Su Park, Young-Min Kim, Yung-Eun Sung, *Journal of Power Sources*, 109 (2002) 439-445.
221. “An all-solid-state supercapacitor using a Nafion<sup>®</sup> polymer membrane and its hybridization for use in direct methanol fuel cells” **Kyung-Won Park**, Hyo-Jin Ahn, Yung-Eun Sung, *Journal of Power Sources*, 109 (2002) 500-506.
222. “Nanoparticle Synthesis and Electrocatalytic Activity of Pt Alloys for Direct Methanol Fuel Cells” Seol-Ah Lee, **Kyung-Won Park**, Jong-Ho Choi, Boo-Kil Kwon, Yung-Eun Sung, *Journal of The Electrochemical Society*, 149(10) (2002) 1299-1304.

### ***Invited Talks***

1. Green Hydrogen Production using Electrolysis, Korea Product Safety Association (KPSA), Seoul, Korea, December 2024.
  2. Anion exchange membrane water electrolysis, KOLON Industries, Inc., Seoul, Korea, April 2024.
  3. Pt-based alloy catalysts for fuel cells, Hyundai Motor Company, Seoul, Korea, November 2023.
  4. Nanostructure catalysts for low-temperature water electrolysis, Korean Electrochemical Society, Yeosu, Korea, October 2023.
  5. Coating technology for proton exchange membrane water electrolysis, Korean Institute of Energy Research, Daejeon, Korea, August 2022.
  6. Electrochemical technology for reducing VOCs, Sejong University, Seoul, May 2021.
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7. Catalysts for lithium-ion exchange membrane water electrolysis, Boyaz energy, Seoul, July 2020.
  8. Low-temperature electrochemical oxidation process for reducing VOCs, Sejong University, Seoul, September 2019.
  9. Oxide supports for high efficiency integrated reversible fuel cell, Chonnam University, Gwangju, Korea, September 2018.
  10. Optimization of metallic catalysts with enhanced electrochemical properties, Korean Institute of Energy Research, Jeju, Korea, November 2017.
  11. PtIr alloy catalysts for high efficiency integrated reversible fuel cell, Chonnam University, Gwangju, Korea, September 2017.
  12. Development of the catalysts for improved electrochemical reactions, Korean Institute of Energy Research, Jeju, Korea, November 2016.
  13. Development of Noble Metal-Free Low-Temperature Fuel Cells Based on High Functional and Multi-Dimensional Carbon Nanostructures, Korea Institute of Energy and Resources Technology Evaluation and Planning, Seoul, Korea, August 2016.
  14. Development of Pt-based multi-metallic catalysts with highly electrochemical activity and stability, Korea Institute of Energy and Resources Technology Evaluation and Planning, Seoul, Korea, November 2015.
  15. Catalysts for high efficiency integrated reversible fuel cell, Chonnam University, Gwangju, Korea, September 2015.
  16. Development of Noble Metal-Free Low-Temperature Fuel Cells Based on High Functional and Multi-Dimensional Carbon Nanostructures, Korea Institute of Energy and Resources Technology Evaluation and Planning, Seoul, Korea, August 2015.
  17. Nanostructure electrodes for electrochemical power sources, Kyunghee University, Yongin, Korea, November 2011.
  18. Synthesis of nanostructure electrodes for electrochemical power sources, Youngnam University, Daegu, Korea, April 2011.
  19. Nanostructure catalysts for polymer electrolyte membrane fuel cells, Cheongju University, Daegu, Korea, April 2010.
  20. Nanostructure materials for dye-sensitized solar cells, Gusan University, Daegu, Korea, January 2010.
  21. Nanostructure catalysts for low-temperature fuel cells, Gwangju Institute of Science and Technology, Gwangju, Korea, October 2009.
  22. Nanostructure catalysts for low-temperature fuel cells, Korea Research Institute of Chemical Technology, Daejeon, Korea, August 2009.
  23. Nanostructures for polymer electrolyte membrane fuel cells, Korean Institute of Energy Research, Daejeon, Korea, August 2009.
  24. Design of Nanostructured Electrocatalysts for Polymer Electrolyte Membrane Fuel Cells, Korean Institute of Ceramic Engineering and Technology, Icheon, Korea, March 2009.
  25. Nanotechnology for H<sub>2</sub>-MeOH fuel cells, KIST, Seoul, Korea, July 2008.
  26. Nanostructures for Microbial Fuel Cells, Gangwon University, Chuncheon, Korea, March 2007.
  27. Nanostructures for Hydrogen/Methanol Fuel Cells, Sungkyunkwan University, Suwon, Korea,
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1. S.-B. Han, K.-W. Park *et al.* Decomposition and circulation system of volatile organic compounds using coal-based activated carbon and hydrogen peroxide, *Republic of Korea Patent No. 10-2619784*, Dec/27/23.
2. D.-H. Park, K.-W. Park *et al.* Enhanced electrocatalytic performance of Metal Phosphide/graphite, *Republic of Korea Patent No. 10-2582151*, Sep/19/23.
3. D.-H. Park, K.-W. Park *et al.* Catalyst for oxygen evolution comprising transition metal oxide and nickel oxide, preparation method thereof, and water electrolysis using the same, *Republic of Korea Patent No. 10-2580930*, Sep/15/23.
4. J.-H. Kim, K.-W. Park *et al.* Selective formation of V<sub>2</sub>O<sub>3</sub>/C composite electrode structure for lithium-based batteries, *Republic of Korea Patent No. 10-2531848*, May/09/23.
5. J.-H. Shin, K.-W. Park *et al.* Synthesis of metal/carbon composite from metal oxide reduction reaction using coffee waste, *Republic of Korea Patent No. 10-2523157*, Apr/13/23.
6. S.-G. Lee, K.-W. Park *et al.* METHOD OF PRODUCING PLATINUM ALLOY CATALYST FOR FUEL CELL, AND FUEL CELL USING SAME, *Republic of Korea Patent No. 10-2571771*, Aug/23/23.
7. S.-H. Moon, K.-W. Park *et al.* Mesoporous tungsten carbide-reduced graphene oxide composite, preparation method thereof, and lithium-sulfur battery comprising same, *Republic of Korea Patent No. 10-2456185*, Oct/13/22.
8. H. Kim, K.-W. Park *et al.* SnO<sub>2</sub> NANOPARTICLE HAVING POROUS STRUCTURE AND METHOD FOR MANUFACTURING THE SAME, *Republic of Korea Patent No. 10-2251048*, May/06/21.
9. J.-H. Choi, K.-W. Park *et al.* MoS<sub>2</sub>-GNS CARBON COMPOSITE NEGATIVE ACTIVE MATERIAL FOR LITHIUM ION BATTERY AND METHOD FOR MANUFACTURING THE SAME, *Republic of Korea Patent No. 10-2247460*, Apr/27/21.
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11. Y.-S. Kim, K.-W. Park *et al.* Ni<sub>2</sub>P CARBON COMPOSITE NEGATIVE ACTIVE MATERIAL FOR LITHIUM ION BATTERY AND METHOD FOR MANUFACTURING THE SAME, *Republic of Korea Patent No. 10-2188523*, Dec/02/20.
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13. E.-S. Kim, K.-W. Park *et al.* POSITIVE ELECTRODE ACTIVE MATERIAL HAVING POLYMER, METHOD FOR MANUFACTURING THE SAME, AND LITHIUM-ION SECONDARY BATTERY INCLUDING THE SAME, *Republic of Korea Patent No. 10-2175137*, Oct/30/20.
14. E.-S. Kim, K.-W. Park *et al.* Synthesis of Anode Active Material and Lithium Rechargeable Battery

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15. Y.-K. Shin, K.-W. Park *et al.* Method for manufacturing porous polymer separator and porous polymer separator manufactured thereby, *Republic of Korea Patent No. 10-2026244*, Sep/23/19.
16. Y.-W. Lee, K.-W. Park *et al.* Synthesis method for Chemical vapor deposition of large-area transition metal dicalcogenide monolayer via controlling the vaporizing concentration of precursors, *Republic of Korea Patent No. 10-2019563*, Sep/02/19.
17. J.-Y. Park, K.-W. Park *et al.* Preparing method of platinum-iridium nanoparticle catalyst with porous structure for oxygen reduction reaction, *Republic of Korea Patent No. 10-1949607*, Feb/12/19.
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19. M.-C. Kim, K.-W. Park *et al.* Preparing method of anode for integrated lithium-air battery with micro-pattern, *Republic of Korea Patent No. 10-1946148*, Jan/30/19.
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21. S.-B. Han, K.-W. Park *et al.* Method for simultaneously removing NO<sub>x</sub> and SO<sub>x</sub>, *Republic of Korea Patent No. 10-1935974*, Dec/31/18.
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25. J.-E. Won, K.-W. Park *et al.* Preparing method of catalyst comprising PtIr/Titanium suboxide for cathode of unitized regenerative fuel cell, *Republic of Korea Patent No. 10-1836678*, Mar/02/18.
26. I.-A. Choi, K.-W. Park *et al.* Preparing method of transition metal-nitrogen doped porous carbon catalyst using amino acid, *Republic of Korea Patent No. 10-1826957*, Feb/01/18.
27. S.-J. Kim, K.-W. Park *et al.* Preparing method for carbon nanofibers composites comprising silicon/silicon nitride and silicon carbide core-shell composites, *Republic of Korea Patent No. 10-1822744*, Jan/22/18.
28. H.-S. Choe, K.-W. Park *et al.* Preparing method of porous Ge/Carbon composites using glucose, *Republic of Korea Patent No. 10-1821880*, Jan/18/18.
29. S. Lee, K.-W. Park *et al.* Preparing method of transition metal-nitrogen doped porous carbon catalyst, *Republic of Korea Patent No. 10-1808910*, Dec/07/17.
30. S. Lee, K.-W. Park *et al.* Preparing method of carbon catalyst with hierarchical meso- macroporous structure, *Republic of Korea Patent No. 10-1799640*, Nov/14/17.
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32. D.-H. Kwak, K.-W. Park *et al.* Sulfur doped porous carbon catalyst and preparing method thereof, *Republic of Korea Patent No. 10-1782001*, Sep/20/17.
33. G.-H. Lee, K.-W. Park *et al.* Preparing method of MoS<sub>2</sub>/carbon nanocomposites, *Republic of Korea*

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36. S.-J. Kim, K.-W. Park *et al.* Preparing method of positive active material, *Republic of Korea Patent No. 10-1627412*, May/30/16.
37. E.-T. Hwang, K.-W. Park *et al.* Platinum-nickel alloy core-shell nanoparticles and making method thereof, *Republic of Korea Patent No. 10-1580410*, Dec/18/15.
38. S.-B. Han, K.-W. Park *et al.* Fuel cell comprising Cathode electrode using iron redox couple, *US Patent No. 9,083,037 B2*, Jul/14/15.
39. K.-H. Lee, K.-W. Park *et al.* Supporting material for oxygen reduction electrode, *Republic of Korea Patent No. 10-1528672*, Jun/08/15.
40. Y.-W. Lee, K.-W. Park *et al.* Titanium Suboxide Supports for Catalyst Electrode of Fuel Cell, and Low Temperature Synthesis of Titanium Suboxide, *Republic of Korea Patent No. 10-1500069*, Mar/20/15.
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46. Y.-W. Lee, K.-W. Park *et al.* Alloy metallic nanostructure and method of it for fuel cell, *Republic of Korea Patent No. 10-1253812*, Apr/05/13.
47. A.-R. Ko, K.-W. Park *et al.* Synthesis Method of mesoporous transition metal nitrides, *Republic of Korea Patent No. 10-1246424*, Mar/15/13.
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55. J.-K. Oh, K.-W. Park *et al.* TiO<sub>2</sub> nanostructure electrodes for dye-sensitized solar cells, *Republic of Korea Patent No. 10-1088923, Nov/25/11.*
56. J.-M. Lee, K.-W. Park *et al.* Catalyst electrode of core/shell nanostructure supports and method of it for fuel cell, *Republic of Korea Patent No. 10-1088978, Nov/25/11.*
57. J.-Y. Kim, K.-W. Park *et al.* Non-platinum transition metal-based macrocycle catalysts for iodide electroreduction, *Republic of Korea Patent No. 10-1039907, Jun/01/11.*
58. H.-J. Ahn, K.-W. Park *et al.* Manufacturing method of nanocomposite electrode for thin film battery integrating solid electrolyte and electrode mater, *Republic of Korea Patent No. 10-0550208, Feb/01/06.*
59. S.-S. Kim, K.-W. Park *et al.* Manufacturing method of platinum-metal oxide nanophase electrode for high-performance dye-sensitized solar cells, *Republic of Korea Patent No. 10-0515649, Jan/29/05.*
60. K.-H. Choi, K.-W. Park *et al.* Quaternary synthetic catalyst for direct methanol fuel cells based on platinum-ruthenium, *Republic of Korea Patent No. 10-0442842, Jul/23/04.*
61. K.-W. Park *et al.* Method for manufacturing electrodes for thin film fuel cells using the co-sputtering method, *Republic of Korea Patent No. 10-0460443, Nov/29/04.*
62. B.-K. Kwon, K.-W. Park *et al.* Polymer electrolyte fuel cell manufacturing method using ruthenium metal oxide, *Republic of Korea Patent 10-0420068, Feb/12/04.*
63. S.-S. Kim, K.-W. Park *et al.* Method for fabricating Pt-MO<sub>x</sub> nanophase electrodes for highly efficient dye-sensitized solar cell, *US Patent No.2005/0016586 A1, Jan/27/05.*
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65. K.-H. Choi, K.-W. Park *et al.* Metal catalyst based on Pt-Ru, a fuel cell electrode, and DMFC, *EU Patent No. EP 1 336 997 A2, Aug/20/03.*
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## Pending

1. D.-H. Park, K.-W. Park *et al.* Cation exchange membrane, manufacturing of the same and cation exchange membrane water electrolysis using the same, *Republic of Korea Patent No. 10-2023-0145269, 2023.10.27.*
2. J.-H. Kim, K.-W. Park *et al.* Double layered hybrid solid-state electrolyte, method for manufacturing of the same and all solid-state battery comprising the same, *Republic of Korea Patent No. 10-2023-0139214, 2023.10.18.*
3. S.-H. Park, K.-W. Park *et al.* Fluorine doped porous carbon catalyst and method for manufacturing thereof, *Republic of Korea Patent No. 10-2023-0136547, 2023.10.13.*
4. D.-H. Park, K.-W. Park *et al.* Positive-electrode active material comprising Iron doped Lithium rich oxide for lithium secondary battery and manufacturing method thereof, *Republic of Korea Patent*

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7. S.-Y. Ahn, K.-W. Park *et al.* Fluorine doped cobalt-free positive-electrode active material for lithium secondary battery and manufacturing method thereof, *Republic of Korea Patent No. 10-2023-0097516*, 2023.07.26.
8. J.-S. Jang, K.-W. Park *et al.* Oxidation-reduction catalyst for metal-air battery, air electrode for metal-air battery including the same, membrane-electrode assembly for metal-air battery including the same and manufacturing method thereof, *Republic of Korea Patent No. 10-2023-0083651*, 2023.06.28.
9. K. Min, K.-W. Park *et al.* A SEARCH DEVICE FOR A CERAMIC ELECTROLYTE MATERIAL INCLUDED IN A COMPOSITE ELECTROLYTE, A SEARCH METHOD FOR A CERAMIC ELECTROLYTE MATERIAL, AND A RECORDING MEDIUM FOR PERFORMING THE SAME, *Republic of Korea Patent No. 10-2023-0072823*, 2023.06.07.
10. D.-H. Park, K.-W. Park *et al.* Catalyst and porous transport electrode for water electrolysis of anion exchange membrane, preparation method thereof and use thereof, *Republic of Korea Patent No. 10-2023-0072161*, 2023.06.05.
11. J.-S. Jang, K.-W. Park *et al.* Preparation method of lithium air battery comprising gel polymer electrolyte, *Republic of Korea Patent No. 10-2023-0062179*, 2023.05.15.
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## ***Technology Transfers***

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### **Intellectual Discovery Co., Ltd. | \$27,000 | 01/2013**

**Title:** Transfer of invention to develop a new concept fuel cell using electrochemical reduction reactions

**Role:** Principal Investigator

### **Boyaz Energy Co., Ltd. | \$1,800 | 12/2016**

**Title:** Carbon-based composite structure oxygen reduction catalyst technology for low-temperature fuel cells

**Role:** Principal Investigator

### **Boyaz Energy Co., Ltd. | \$7,200 | 11/2017**

**Title:** Fuel cells and fuel cells including cathode electrodes using iron redox pairs

**Role:** Principal Investigator

### **Wifinetech Co., Ltd. | \$3,600 | 03/2019**

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**Title:** Method for producing porous carbon catalyst doped with transition metal and nitrogen  
**Role:** Principal Investigator

**CU Energy Co., Ltd. | \$3,600 | 04/2019**

**Title:** Manufacturing method of positive electrode active material

**Role:** Principal Investigator

**Dongwoo Cast Co., Ltd. | \$3,600 | 04/2019**

**Title:** Titanium oxide-coated cathode active material for lithium-ion batteries and method for manufacturing the same

**Role:** Principal Investigator

**Dongwoo Cast Co., Ltd. | \$3,600 | 04/2019**

**Title:** Nanostructure-controlled alloy for fuel cell catalyst electrode and manufacturing method thereof

**Role:** Principal Investigator

**JIS Co., Ltd. | \$3,600 | 05/2019**

**Title:** Catalyst support for oxygen reduction electrode

**Role:** Principal Investigator

**JIS Co., Ltd. | \$3,600 | 05/2019**

**Title:** Core/shell structured nano support for catalyst electrodes for fuel cells and method of manufacturing the same

**Role:** Principal Investigator

**SM Hitech Co., Ltd. | \$4,500 | 08/2021**

**Title:** MoS<sub>2</sub>-TiN thin film electrode manufacturing method for improved electrochemical performance of lithium ion batteries

**Role:** Principal Investigator

**SAMIL Chemical Co., Ltd. | \$4,500 | 09/2021**

**Title:** Method for manufacturing porous germanium-carbon composite using glucose

**Role:** Principal Investigator

**FILAST Chemical Co., Ltd. | \$4,500 | 10/2021**

**Title:** Method for simultaneous removal of nitrogen oxides and sulfur oxides

**Role:** Principal Investigator

**Boyaz Energy Co., Ltd. | \$2,700 | 11/2021**

**Title:** Method for manufacturing a porous polymer separator and porous polymer separator manufactured thereby

**Role:** Principal Investigator

**Boyaz Energy Co., Ltd. | \$2,700 | 11/2021**

**Title:** SnO<sub>2</sub> nanoparticles with porous structure and method of manufacturing the same

**Role:** Principal Investigator

**Hydrogene Tech Co., Ltd. | \$18,000 | 07/2022**

**Title:** Precious metal/transition metal oxide catalyst for water electrolysis and method for manufacturing the same

**Role:** Principal Investigator