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## EDUCATION

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### The University of Texas at Austin

**Ph.D.** in Chemical Engineering with Dr. C. Grant Willson and Dr. Nathaniel A. Lynd 2019

Diss.: “*Functional Organic Materials for Directed Self-assembly of Silicon-containing Block Copolymers*”

### Seoul National University

**M.S.** in Chemical and Biological Engineering with Dr. Kookheon Char 2013

**B.S.** in Chemical and Biological Engineering, *Cum Laude* 2011

## APPOINTMENTS

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### Korea Institute of Science and Technology (KIST)

Senior Research Scientist, Clean Energy Research Center 2020–*pres.*

Research Scientist, Clean Energy Research Center 2013–2016

## HONORS AND AWARDS

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Kwanjeong Educational Foundation Fellowship 2016–2019

Graduate Dean’s Prestigious Fellowship, UT Austin 2016–2019

Superior Academic Performance Scholarship, Seoul National University 2012

BK21 Scholarship, National Research Foundation (NRF) of Korea 2011–2012

National Undergraduate S&T Scholarship, Korea Science and Engineering Foundation 2007–2011

Gwangju Institute of Science and Technology (GIST) Scholarship 2006

Bronze Prize, Korean Chemistry Olympiad (KChO) 2005

## PUBLICATIONS

[\[Google Scholar\]](#)

1. Lee, W. H.; Kim, K.; Koh, J. H.; Lee, D. K.; Won, D. H.; Oh, H.-S.; Lee, U.; Min, B. K. The green-ol (green-alcohol) economy. *Nano Energy* **2023**, *110*, 108373, [doi].
2. Park, G. S.; Lee, S.; Kim, D.-S.; Park, S. Y.; Koh, J. H.; Won, D. H.; Lee, P.; Do, Y. R.; Min, B. K. Amorphous TiO<sub>2</sub> passivating contacts for Cu(In,Ga)(S,Se)<sub>2</sub> ultrathin solar cells: Defect-state-mediated hole conduction. *Adv. Energy Mater.* **2023**, *13*, 2203183, [doi].
3. Park, J.; Ko, Y.-J.; Lim, C.; Kim, H.; Min, B. K.; Lee, K.-Y.; Koh, J. H.; Oh, H.-S.; Lee, W. H. Strategies for CO<sub>2</sub> electroreduction in cation exchange membrane electrode assembly. *Chem. Eng. J.* **2023**, *453*, 139826, [doi].
4. Langie, K. M. G.; Tak, K.; Kim, C.; Lee, H. W.; Park, K.; Kim, D.; Jung, W.; Lee, C. W.; Oh, H.-S.; Lee, D. K.; Koh, J. H.; Min, B. K.; Won, D. H.; Lee, U. Toward economical application of carbon capture and utilization technology with near-zero carbon emission. *Nat. Commun.* **2022**, *13*, 7482, [doi].

5. Han, M. H.; Ko, Y.-J.; Lee, S. Y.; Lim, C.; Lee, W. H.; Pin, M. W.; Koh, J. H.; Kim, J.; Kim, W.; Min, B. K.; Oh, H.-S. Thermo-selenized stainless steel as an efficient oxygen evolution electrode for water splitting and CO<sub>2</sub> electrolysis in real water matrices. *J. Power Sources* **2022**, *521*, 230953, [doi].
6. Han, M. H.; Pin, M. W.; Koh, J. H.; Park, J. H.; Kim, J.; Min, B. K.; Lee, W. H.; Oh, H.-S. Improving the oxygen evolution reaction using electronic structure modulation of sulfur-retaining nickel-based electrocatalysts. *J. Mater. Chem. A Mater. Energy Sustain.* **2021**, *9*, 27034–27040, [doi].
7. Koh, J. H.; Zhu, Q.; Asano, Y.; Maher, M. J.; Ha, H.; Kim, S.-S.; Cater, H. L.; Mapesa, E. U.; Sangoro, J. R.; Ellison, C. J.; Lynd, N. A.; Willson, C. G. Unusual Thermal Properties of Certain Poly(3,5-disubstituted styrene)s. *Macromolecules* **2020**, *53*, 5504–5511, [doi].
8. Doise, J.; Koh, J. H.; Kim, J. Y.; Zhu, Q.; Kinoshita, N.; Suh, H. S.; Delgadillo, P. R.; Vandenberghe, G.; Willson, C. G.; Ellison, C. J. Strategies for Increasing the Rate of Defect Annihilation in the Directed Self-Assembly of High- $\chi$  Block Copolymers. *ACS Appl. Mater. Interfaces* **2019**, *11*, 48419–48427, [doi].
9. Koh, J. H.; Won, D. H.; Eom, T.; Kim, N.-K.; Jung, K. D.; Kim, H.; Hwang, Y. J.; Min, B. K. Facile CO<sub>2</sub> Electro-Reduction to Formate via Oxygen Bidentate Intermediate Stabilized by High-Index Planes of Bi Dendrite Catalyst. *ACS Catal.* **2017**, *7*, 5071–5077, [doi].
10. Sung, Y.; Lim, J.; Koh, J. H.; Min, B. K.; Pyun, J.; Char, K. Arm length dependency of Pt-decorated CdSe tetrapods on the performance of photocatalytic hydrogen generation. *Korean J. Chem. Eng.* **2016**, *33*, 2287–2290, [doi].
11. Nursanto, E. B.; Jeon, H. S.; Kim, C.; Jee, M. S.; Koh, J. H.; Hwang, Y. J.; Min, B. K. Gold catalyst reactivity for CO<sub>2</sub> electro-reduction: From nano particle to layer. *Catal. Today* **2016**, *260*, 107–111, [doi].
12. Jee, M. S.; Jeon, H. S.; Kim, C.; Lee, H.; Koh, J. H.; Cho, J.; Min, B. K.; Hwang, Y. J. Enhancement in carbon dioxide activity and stability on nanostructured silver electrode and the role of oxygen. *Appl. Catal. B* **2016**, *180*, 372–378, [doi].
13. Sung, Y.; Lim, J.; Koh, J. H.; Hill, L. J.; Min, B. K.; Pyun, J.; Char, K. Uniform decoration of Pt nanoparticles on well-defined CdSe tetrapods and the effect of their Pt cluster size on photocatalytic H<sub>2</sub> generation. *CrystEngComm* **2015**, *17*, 8423–8427, [doi].
14. Jeon, H. S.; Koh, J. H.; Park, S. J.; Jee, M. S.; Ko, D.-H.; Hwang, Y. J.; Min, B. K. A monolithic and standalone solar-fuel device having comparable efficiency to photosynthesis in nature. *J. Mater. Chem. A Mater. Energy Sustain.* **2015**, *3*, 5835–5842, [doi].
15. Yoon, H.; Sung, S. H.; Koh, J. H.; Kim, S. M.; Choi, S.-J.; Suh, K. Y.; Char, K. Directional step flow across ridges on multiscale two-face prism array. *Macromol. Res.* **2015**, *23*, 145–148, [doi].
16. Koh, J. H.; Jeon, H. S.; Jee, M. S.; Nursanto, E. B.; Lee, H.; Hwang, Y. J.; Min, B. K. Oxygen Plasma Induced Hierarchically Structured Gold Electrocatalyst for Selective Reduction of Carbon Dioxide to Carbon Monoxide. *J. Phys. Chem. C* **2015**, *119*, 883–889, [doi].
17. Wooh, S.; Koh, J. H.; Lee, S.; Yoon, H.; Char, K. Trilevel-structured superhydrophobic pillar arrays with tunable optical functions. *Adv. Funct. Mater.* **2014**, *24*, 5550–5556, [doi].
18. Wooh, S.; Yoon, H.; Jung, J.-H.; Lee, Y.-G.; Koh, J. H.; Lee, B.; Kang, Y. S.; Char, K. Efficient light harvesting with micropatterned 3D pyramidal photoanodes in dye-sensitized solar cells. *Adv. Mater.* **2013**, *25*, 3111–3116, [doi].

19. Kim, S. M.; Kang, D. H.; Koh, J. H.; Suh, H. S.; Yoon, H.; Suh, K.-Y.; Char, K. Thermo-responsive switching of liquid flow direction on a two-face prism array. *Soft Matter* **2013**, *9*, 4145–4149, [doi].

## PATENTS

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1. “Silver incorporated chalcopyrite thin film and manufacturing method thereof,” Byoung Koun Min, Byung Woo Kim, Yun Jeong Hwang, Hyung-Suk Oh, Ung Lee, Dong Ki Lee, Da Hye Won, Jai Hyun Koh. KR Patent 10-2512512.
2. “Iridium alloy catalyst having reversible catalytic activity and preparation method thereof,” Hyung-Suk Oh, Woong Hee Lee, Byoung Koun Min, Yun Jeong Hwang, Ung Lee, Dong Ki Lee, Da Hye Won, Jai Hyun Koh. KR Patent 10-2491462.
3. “A hydrogen production and storage system using solar energy independently operated without external power,” Ung Lee, Byoung Koun Min, Hyun Joo Lee, Yun Jeong Hwang, Hyung-Suk Oh, Dong Ki Lee, Da Hye Won, Jai Hyun Koh, Dong Gu Han. KR Patent 10-2434620.
4. “Carbon dioxide (CO<sub>2</sub>) recycling electrochemical device,” Ung Lee, He Won Lee, Kyeong Su Kim, Jai Hyun Koh, Da Hye Won, Dong Ki Lee, Hyung-Suk Oh, Yun Jeong Hwang, Byoung Koun Min. KR Patent 10-2418964.
5. “Catalyst electroode, method for manufacturing the catalyst electrode, electrochemical reactor comprising the same and system for reduction of carbon dioxide,” Da Hye Won, Ung Lee, Hyung-Suk Oh, Dong Ki Lee, Jai Hyun Koh, Byoung Koun Min. KR Patent 10-2409746.
6. “System for reduction of carbon dioxide,” Ung Lee, Da Hye Won, Dong Ki Lee, Hyung-Suk Oh, Jai Hyun Koh, Byoung Koun Min. KR Patent 10-2399070.
7. “Self-driving electrochemical cell,” Ung Lee, Byoung Koun Min, Hyun Joo Lee, Yun Jeong Hwang, Hyung-Suk Oh, Dong Ki Lee, Da Hye Won, Jai Hyun Koh, Kyeong Su Kim. KR Patent 10-2386012.
8. “Electrocatalyst for CO<sub>2</sub> reduction and method for manufacturing the same,” Hyung-Suk Oh, Woong Hee Lee, Chulwan Lim, Yun Jeong Hwang, Ung Lee, Dong Ki Lee, Da Hye Won, Jai Hyun Koh. KR Patent 10-2372659.
9. “Photoelectrode for hydrogen generation in solar water splitting and manufacturing method thereof,” Dong Ki Lee, Byoung Koun Min, Byung Woo Kim, Yun Jeong Hwang, Hyung Suk Oh, Ung Lee, Jai Hyun Koh. KR Patent 10-2311750.
10. “Photoelectrochemical artificial photosynthesis device,” Byoung Koun Min, Yun Jeong Hwang, Jai Hyun Koh, Hyo Sang Jeon. KR Patent 10-2155231.
11. “Carbon dioxide reduction electrode and the preparation method thereof,” Byoung Koun Min, Jai Hyun Koh, Yun Jeong Hwang. KR Patent 10-1636024.
12. “Selective reducing method of carbon dioxide using silicon nanowire and pyridine,” Yun Jeong Hwang, Byoung Koun Min, Oh Shim Joo, Jai Hyun Koh, Sang Jun Sim, Hyo Sang Jeon, Michael Shincheon Jee. KR Patent 10-1566471.

## RESEARCH SUPERVISION

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<b>Current Graduate Students</b>	<b>Undergraduate Institution</b>	<b>Period</b>
Chanwoo Lee	Louisiana Tech University	09/2021– <i>present</i>
Jihyun Park	Hanseo University	03/2023– <i>present</i>
<b>Current Visiting Students</b>	<b>Institution</b>	<b>Period</b>
Young In Song	Sungkyunkwan University	03/2023– <i>present</i>
<b>Current Undergraduate Students</b>	<b>Institution</b>	<b>Period</b>
Hyeon Ji Kim	Yonsei University	12/2022– <i>present</i>
<b>Former Undergraduate Students</b>	<b>Institution</b>	<b>Period</b>
Su Min Choi	Konkuk University	09/2022–12/2022
Hyesu Song	Sogang University	09/2022–12/2022
Da Young Shim	Hanyang University	06/2022–08/2022
Gyeongjin Kwon	Yonsei University	03/2022–08/2022
Minju Kang	Ewha Womans University	01/2022–02/2022
Kwanwoo Chun	Hanyang University	09/2021–02/2022

## SELECTED ORAL PRESENTATIONS

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**[Invited]** Departmental Seminar, Department of Chemical Engineering, Hongik University, “Functional Materials for Electrochemical CO<sub>2</sub> Reduction,” Seoul, Korea, November 29<sup>th</sup>, 2022.

**[Invited]** 2022 KICChE Spring Meeting, “Design and synthesis of silicon-containing block copolymers for nanolithography,” Jeju, Korea, April 21<sup>st</sup>, 2022.

**[Invited]** 2022 Polymer Society of Korea Spring Meeting, “Functional Organic Materials for Directed Self-assembly of Block Copolymers,” Daejeon, Korea, April 8<sup>th</sup>, 2022.

**[Invited]** 2019 ACS Fall National Meeting, “Selective grafting of polymer brushes enables directed self-assembly of high- $\chi$  block copolymers,” San Diego, CA, August 26<sup>th</sup>, 2019.

2019 SPIE Advanced Lithography Conference, “Selective grafting of polymer brushes for directed self-assembly of high- $\chi$  block copolymers,” San Jose, CA, February 27<sup>th</sup>, 2019.

2015 ACS Fall National Meeting, “Electrochemical CO<sub>2</sub> conversion catalysts for integrated monolithic solar-fuel generators,” Boston, MA, August 16<sup>th</sup>, 2015.

2014 MRS Spring Meeting & Exhibit, “Photoelectrochemical CO<sub>2</sub> Conversion for Fuel Production Powered by Monolithic Thin-Film Photovoltaic Devices,” San Francisco, CA, April 24<sup>th</sup>, 2014.