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## EDUCATION

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### The University of Texas at Austin

**Ph.D.** in Chemical Engineering with Drs. C. Grant Willson and Nathaniel A. Lynd 2019  
Dissertation: “*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

## EXPERIENCE

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

Senior Research Scientist, Clean Energy Research Center 2020–present  
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  
Bronze Prize, Samsung HumanTech Paper Award 2013  
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

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[\[Google Scholar\]](#)

13. Unusual Thermal Properties of Certain Poly(3,5-disubstituted styrene)s. Koh, J. H.<sup>†</sup>; Zhu, Q.<sup>‡</sup>; 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.\* *Macromolecules* **2020**, *53*, 5504–5511. [\[doi\]](#)
12. Strategies for Increasing the Rate of Defect Annihilation in the Directed Self-Assembly of High- $\chi$  Block Copolymers. Doise, J.; Koh, J. H.; Kim, J. Y.; Zhu, Q.; Kinoshita, Natsuko; Suh, H. S.; Delgadillo, P. R.; Vandenberghe, G.; Willson, C. G.; Ellison, C. J.\* *ACS Appl. Mater. Interfaces* **2019**, *11*, 48419–48427. [\[doi\]](#)
11. Facile CO<sub>2</sub> Electro-Reduction to Formate via Oxygen Bidentate Intermediate Stabilized by High-Index Planes of Bi Dendrite Catalyst. Koh, J. H.<sup>†</sup>; Won, D. H.<sup>‡</sup>; Eom, T.<sup>‡</sup>; Kim, N. K.; Jung, K. D.; Kim, H.\*; Hwang, Y. J.\*; Min, B. K.\* *ACS Catal.* **2017**, *7*, 5071–5077. [\[doi\]](#)
10. Arm Length Dependency of Pt-Decorated CdSe Tetrapods on the Performance of Photocatalytic

- Hydrogen Generation. Sung, Y.; Lim, J.; Koh, J. H.; Min, B. K.; Pyun, J.\*; Char, K.\* *Korean J. Chem. Eng.* **2016**, *33*, 2287–2290. [[doi](#)]
9. Enhancement in Carbon Dioxide Reduction Activity and Stability on Nanostructured Silver Electrode and the Role of Oxygen. Jee, M. S.; Jeon, H. S.; Kim, C.; Lee, H.; Koh, J. H.; Cho, J.; Min, B. K.\*; Hwang, Y. J.\* *Appl. Catal., B* **2016**, *180*, 372–378. [[doi](#)]
  8. Gold Catalyst Reactivity for CO<sub>2</sub> Electro-Reduction: From Nano Particle to Layer. Nursanto, E. B.; Jeon, H. S.; Kim, C.; Jee, M. S.; Koh, J. H.; Hwang, Y. J.\*; Min, B. K.\* *Catal. Today* **2016**, *260*, 107–111. [[doi](#)]
  7. Oxygen Plasma Induced Hierarchically Structured Gold Electrocatalyst for Selective Reduction of Carbon Dioxide to Carbon Monoxide. Koh, J. H.; Jeon, H. S.; Jee, M. S.; Nursanto, E. B.; Lee, H.; Hwang, Y. J.\*; Min, B. K.\* *J. Phys. Chem. C* **2015**, *119*, 883–889. [[doi](#)]
  6. Uniform Decoration of Pt Nanoparticles on Well-Defined CdSe Tetrapods and Their Effect of Pt Cluster Size on the Photocatalytic H<sub>2</sub> Generation. Sung, Y.; Lim, J.; Koh, J. H.; Hill, L. J.; Min, B. K.; Pyun, J.\*; Char, K.\* *CrystEngComm* **2015**, *17*, 8423–8427. [[doi](#)]
  5. A Monolithic and Standalone Solar-Fuel Device Having Comparable Efficiency to Photosynthesis in Nature. Jeon, H. S.; Koh, J. H.; Park, S. J.; Jee, M. S.; Ko, D.; Hwang, Y. J.\*; Min, B. K.\* *J. Mater. Chem. A* **2015**, *3*, 5835–5842. [[doi](#)] [[back cover](#)]
  4. Directional Step Flow across Ridges on Multiscale Two-Face Prism Array. Yoon, H.\*; Sung, S. H.; Koh, J. H.; Kim, S. M.; Choi, S. J.; Suh, K. Y.; Char, K.\* *Macromol. Res.* **2015**, *23*, 145–148. [[doi](#)]
  3. Trilevel-Structured Superhydrophobic Pillar Arrays with Tunable Optical Functions. Wooh, S.†; Koh, J. H.† (co-first); Lee, S.; Yoon, H.\*; Char, K.\* *Adv. Funct. Mater.* **2014**, *24*, 5550–5556. [[doi](#)] [[inside front cover](#)]
  2. Efficient Light Harvesting with Micropatterned 3D Pyramidal Photoanodes in Dye-Sensitized Solar Cells. Wooh, S.; Yoon, H.; Jung, J. H.; Lee, Y. G.; Koh, J. H.; Lee, B.; Kang, Y. S.\*; Char, K.\* *Adv. Mater.* **2013**, *25*, 3111–3116. [[doi](#)]
  1. Thermoresponsive switching of liquid flow direction on a two-face prism array. Kim, S. M.†; Kang, D. H.†; Koh, J. H.; Suh, H. S.; Yoon, H.\*; Suh, K.-Y.\*; Char, K.\* *Soft Matter* **2013**, *9*, 4145–4149. [[doi](#)] [[front cover](#)]

## PATENTS

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### Issued Patents:

3. “Photoelectrochemical artificial photosynthesis device,” Byoung Koun Min, Yun Jeong Hwang, Jai Hyun Koh, Hyo Sang Jeon. KR Patent 10-2155231.
2. “Carbon dioxide reduction electrode and the preparation method thereof,” Byoung Koun Min, Jai Hyun Koh, Yun Jeong Hwang. KR Patent 10-1636024.
1. “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.

## Patent Applications:

17. "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 Application 10-2021-0118956.
16. "Catalyst-electrode structure and electrochemical reactor using the same and system of utilizing carbon dioxide using the same," Ung Lee, Da Hye Won, Jai Hyun Koh, Dong Ki Lee, Hyung-Suk Oh, Hyun Joo Lee, Byoung Koun Min, Young Jin Ko, Chang Soo Kim. KR Patent Application 10-2021-0109554.
15. "System of utilizing carbon dioxide," Ung Lee, Da Hye Won, Jai Hyun Koh, Dong Ki Lee, Hyung-Suk Oh, Byoung Koun Min. KR Patent Application 10-2021-010953.
14. "Flow plate for electrochemical carbon dioxide reduction device forming unidirectional flow," Ung Lee, Chang Soo Kim, Da Hye Won, Jai Hyun Koh, Hyung-Suk Oh, Dong Ki Lee, Byoung Koun Min. KR Patent Application 2021-0055388.
13. "High crystallinity design of iridium alloy nanoparticles derive reversible catalytic property for Oxygen evolution/ Hydrogen evolution/Hydrogen oxidation," Hyung-Suk Oh, Woong Hee Lee, Byoung Koun Min, Yun Jeong Hwang, Ung Lee, Dong Ki Lee, Da Hye Won, Jai Hyun Koh. US Patent Application 17/197,893.
12. "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 Application 10-2020-012888.
11. "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 Application 2020-0112551.
10. "Electrochemical devices that can recycle reactants fluids," Ung Lee, Kyeong Su Kim, Dong Gu Han, Dong Ki Lee, Jai Hyun Koh, Da Hye Won, Yun Jeong, Hwang, Byoung Koun Min, Hyun Joo Lee, Hyung Suk Oh. KR Patent Application 10-2020-009772.
9. "Electrocatalyst for CO<sub>2</sub> reduction and method for manufacturing the same," Hyung Suk Oh, Woong Hee Lee, Chul Wan Lim, Byoung Koun Min, Yun Jeong Hwang, Ung Lee, Dong Ki Lee, Da Hye Won, Jai Hyun Koh. KR Patent Application 2020-0058372.
8. "Electrochemical device that can produce liquid products with high efficiency," 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 Application 10-2020-0029669.
7. "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 Application 10-2020-0029668.
6. "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. US Patent Application 17/017,845.
5. "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, Donggu Han. KR Patent Application 10-2020-0034865.

4. "Self-driving electrochemical cell," Ung Lee, Byoung Koun Min, Hyunjoo Lee, Yun Jeong Hwang, Hyung Suk Oh, Dong Ki Lee, Da Hye Won, Jai Hyun Koh, Kyeongsu Kim. KR Patent Application 10-2020-0029670.
3. "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. US Patent Application 16/804,001.
2. "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 Application 2020-0017903.
1. "Nickel based electrocatalyst for water oxidation and process of preparing the same," Yun Jeong Hwang, Byoung Koun Min, Hyo Sang Jeon, Jai Hyun Koh. KR Patent Application 2015-0158885.

### **SELECTED ORAL PRESENTATIONS**

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**[Invited]** American Chemical Society (ACS) Fall 2019 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.

American Chemical Society (ACS) Fall 2015 National Meeting, "Electrochemical CO<sub>2</sub> conversion catalysts for integrated monolithic solar-fuel generators," Boston, MA, August 16<sup>th</sup>, 2015.

2014 Materials Research Society (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.