


BIOGRAPHICAL SKETCH

| NAME Myung-Hoon (Brian), Choi | |  | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| POSITION TITLE Ph.D. Candidate / Postdoctoral Research Staff | | | |
| Physical Address: Office: Chemistry 1011 Department of Chemistry Phone: (812) 369-7612 Texas A&M 3255, College Station, TX 77843-3255 Email: brchoi@tamu.edu | | | |
| EDUCATION/TRAINING | | | |
| INSTITUTION AND LOCATION | DEGREE | MM/YY | FIELD OF STUDY |
| Indiana University (Bloomington, IN, US) | Ph.D. candidate | 2017 ~ 03. 2022 (expected) | Analytical Chemistry -Electrochemistry -Materials Chemistry |
| Kyunggi University (Suwon, South Korea) Kyunggi University (Suwon, South Korea) | M.S. B.S. | 2007 ~ 2009 1999 ~ 2006 | Biotechnology Biology |

A. Personal Statement

I am a postdoctoral researcher in the department of chemistry, Texas A&M university under the mentorship of Prof. Lane A. Baker. My research interests and skills are focused on nanoscale analysis for electrochemistry. My role in science is to link the electrochemical methods with advanced applications of scanning probe microscopy (SPM) in solid materials & biomaterials sciences.

In recent works, an electrochemical SPM, called as scanning electrochemical cell microscopy (SECCM) was constructed and evaluated for nanoscale electrochemical response measurements for facet-dependent catalytic activity of single nanocrystals.

Reduction reactions (i.e. hydrogen evolution and oxygen reduction) on model NP catalysts, single Au cubes and octahedrons were studied with SECCM Cyclic Voltammetry mapping. Additionally, a method for removal of CTAB inherently adhered on the surface of nanocrystals was developed, with characterization by atomic force microscopy (AFM) and scanning electron microscopy (SEM).

Next, I built environmentally controlled SECCM to investigate the electrocatalytic response of individual Au nanocrystal catalysts for CO₂ reduction reaction (CO₂RR). We measured CO₂RR at single Au octahedra (OD), rhombic dodecahedra (RD) and truncated ditetragonal prism (TDP) with constant CO₂ gas flow through the environment chamber.

I also have skills of various applications in atomic force microscopy (AFM) and scanning electron microscopy (SEM) which are beneficial for studies in materials electrochemistry.

I am always excited and open-minded to explore new research area in which SPM applications help to expand our understanding of the unresolved principle of science.

B. Positions and Honors

Professional Employment

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|---------------------------|--------------------------------------------------------------------|
| 2022 spring – 2023 spring | Postdoctoral research specialist, Chemistry, Texas A&M |
| 2019 fall – 2022 spring | Assistant researcher, Chemistry, Indiana University in Bloomington |
| 2017 fall – 2019 fall | Associate Instructor, Chemistry, Indiana University in Bloomington |
| 2009 spring – 2017 fall | Application Engineer AFM, Park Systems, South Korea |
| 2008 spring – 2009 spring | Laboratory Manager, Microbiology, Kyung-gi Univ., South Korea |

Professional Activities

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|-----------------------|--------------------------------------------------------------|
| 2018 spring – present | Membership – International Society of Electrochemistry (ISE) |
| 2017 fall – present | Membership – American Chemical Society |

C. Publications

1. Siepser, N.P.; **Choi, M.-H.**; Alden, S.E.; Baker L.A. Single-Entity Electrocatalysis at Electrode Ensembles Prepared by Template Synthesis. *J. Electrochem. Soc.*, **2021**, *168*, 126526
2. **Choi, M.-H.**; Leason C.W.; Baker, L.A. Analytical Applications of Scanning Ion Conductance Microscopy: Measuring Ions and Electrons. *Bioanal. Reviews*, **2021**, Springer (Bookchapter)
3. Jagdale, G. S.; **Choi, M.-H.**; Siepser, N. P.; Jeong, S. J.; Wang, Y.; Skalla, R. X.; Huang, K.; Ye, X.; Baker, L. A., Electrospray Deposition for Single Nanoparticle Studies. *Anal. Methods* **2021**, *13*, 4105-4113.
4. **Choi, M.-H.**; Jeong, S.-J.; Wang, Y.; Cho, S.-J.; Park, S.-I.; Ye, X. C.; Baker, L. A., Characterization of Ligand Adsorption at Individual Gold Nanocubes. *Langmuir* **2021**, *37*, 7701-7711.
5. **Choi, M.H.**; Siepser, N.P.; Jeong, S.J.; Wang, Y.; Jagdale, G.; Ye, X.; Baker, L.A. Probing single-particle electrocatalytic activity at facet-controlled gold nanocrystals *Nano Lett.* **2020**, *20*, 2, 1233-1239
6. Alden, S.E.; Siepser, N.P.; Patterson, J.A., Jagdale, G.; **Choi, M.H.** and Baker, L.A. Array Microcell Method (AMCM) for Serial Electroanalysis *ChemElectroChem* **2020**, *7*, 1-9
7. **Choi, M.H.**; Baker, L. A. Biphasic-Scanning Ion Conductance Microscopy *Anal. Chem.* **2018**, *90*, 11797–11801
8. Zhu, Ch.; Zhou, L.; **Choi, M.H.**; Baker, L. A. Mapping surface charge of individual microdomains with scanning ion conductance microscopy *ChemElectroChem* **2018**, *5*, 2986-2990
9. Kim, J.h.; **Choi, M.H.**; Jung, G.-E.; Abdul Rahim F.; Cho, N.-J.; Cho, S.-J. Dimensional comparison between amplitude-modulation atomic force microscopy and scanning ion conductance microscopy of biological samples *Jpn. J. Appl. Phys* **2016**, *55*, 8S1
10. Mizutani, Y.; **Choi, M.H.**; Cho, S.-J.; Okajima, T. Nanoscale fluctuations on epithelial cell surfaces investigated by scanning ion conductance microscopy *Appl. Phys. Lett* **2013**, *102*, 173703
11. Ushiki, T.; Nakajima, M.; **Choi, M.H.**; Cho, S.-J.; Iwata, F. Scanning ion conductance microscopy for imaging biological samples in liquid: A comparative study with atomic force microscopy and scanning electron microscopy *Micron* **2012**, *43*, 1390.

D. Oral presentations

1. **Choi, M.H.**; Siepser, N.P.; Jeong, S.J.; Wang, Y.; Jagdale, G.; Ye, X.; Baker, L.A. Probing single-particle electrocatalytic activity at facet-controlled gold nanocrystals. Presented at Nano Scientific Symposium, 2020
2. **Choi, M. H.**; Jung, G.-E.; Cho, Y.-S.; Park, S.-I.; Cho, S.-J. Scanning Ion Conductance Microscopy (SICM) Technology and its Applications. Presented at Stanford Nano Shared Facilities (SNSF) Workshop, Stanford Univ., 2015.
3. **Choi, M. H.**; Jung, G.-E.; Cho, Y.-S.; Park, S.-I.; Cho, S.-J. Dynamic Live Cell Imaging in High Resolution Imaging of Live Cell Dynamics using Scanning Ion Conductance Microscopy (SICM). Presented at American Chemical Society meeting, San Diego, 2015.
4. **Choi, M. H.**; Jung, G.-E.; Park, S.-I.; Cho, S.-J. Cell Discovery like Never Before with Bio-Scanning Probe Microscopy. Presented at Korean Society of Microscopy, 2013.
5. **Choi, M. H.**; Jung, G.-E.; Cho, Y.-S.; Park, S.-I.; Cho, S.-J. Cell Discovery like Never Before with Bio-Scanning Probe Microscopy. Presented at European Material Research Society (E-MRS), 2012.
6. **Choi, M. H.**; Park, S.-I.; Cho, S.-J. Scanning Ion Conductance Microscopy (SICM) Technology and its Applications. Presented at Stanford Nano Shared Facilities (SNSF) Workshop, Harvard Univ., 2013.

E. Awards

1. **C500 award**, given to an outstanding graduate student in the first year of *Ph. D course* in 2019
2. **Microscopy award** from oral presentation in *Nano Scientific Symposium*, given to one of attendees who showed significant achievement for nanoscale research with scanning probe microscopy (SPM) in 2020
3. **Poster Prize** at the *Next Generation Nano electrochemistry Faraday Discussion* in 2021