

## Erwei Huang, PhD

Research Associate, Chemistry Division, Brookhaven National Laboratory, Upton, NY 11973

E-mail: [erwei.huang@outlook.com](mailto:erwei.huang@outlook.com) Phone: +1-631-428-9753

### Education

2017/08-2022/08	<b>Stony Brook University, SUNY</b> Doctor of Philosophy, Chemistry	<b>New York, USA</b>
2014/08-2017/07	<b>Nankai University</b> Master of Science, Physical Chemistry	<b>Tianjin, China</b>
2010/08-2014/07	<b>Zhengzhou University</b> Bachelor of Science, Chemistry	<b>Zhengzhou, China</b>

### Honors & Awards

Stony Brook University Lee Myers Award for Outstanding Doctoral Student	2022
Stony Brook University Department of Chemistry Graduate Student Speakers	2022
North American Catalysis Society 27 <sup>th</sup> Meeting Kokes Award	2022
American Chemical Society 2021 Fall Meeting ENFL Division SPAC First Prize	2021
Brookhaven National Laboratory Dr. Mow Shiah Lin Scholarship	2020
National Institute for Advanced Materials Innovative Scholarship	2017
Nankai University Li Hexuan Nomination Award	2017
Zhengzhou University Outstanding Graduate	2014

### Professional Experiences

**Brookhaven National Laboratory (2022/09 - present)** **New York, USA**

*Research Associate, Advisor: Dr. Jingguang G. Chen*

Project: Computational multiscale modelling for selective carbon dioxide conversion on bimetallic catalysts.

**Stony Brook University & Brookhaven National Lab (2018/07 – 2022/08)** **New York, USA**

*Research Assistant, Advisor: Dr. Ping Liu*

Ph.D. Dissertation: Selective Methane Conversion over Copper-based Metal Oxide Catalysts: From Mechanistic Understanding toward Rational Catalyst Optimization

- Design and conduct computational studies for mechanistic understanding of selective methane reforming over complex inverse metal oxides catalysts.
- Analyze research data and extract key descriptors to screen optimal inverse catalysts for selective methane reforming to methanol.

**Stony Brook University (2017/08 – 2018/06)** **New York, USA**

*Teaching Assistant, Lecturer: Dr. Mohammad J. Akhtar*

- General Chemistry Lab (I & II)

**Nankai University (2014/08-2017/07)** **Tianjin, China**

Research Assistant, Advisor: Dr. Landong Li

- Controlled syntheses and characterizations of SnS<sub>2</sub> and GaN semiconductor nanocrystals.
- Exploration of the nanocrystals morphology's effects on photoelectrochemical properties.

## **Publications & Patents**

Google Scholar: <https://scholar.google.com/citations?user=qPW10woAAAAJ&hl=en>

† (contributed equally) \* (corresponding author)

**Paper published as (co)first author:**

1. Zongyuan Liu†, **Erwei Huang†**, Ivan Orozco, Wenjie Liao, Robert M. Palomino, Ning Rui, Thomas Duchoň, Slavomir Nemšák, David C. Grinter, Mausumi Mahapatra, Ping Liu\*, José A. Rodriguez\* and Sanjaya D. Senanayake\*, Water-promoted interfacial pathways in methane oxidation to methanol on a CeO<sub>2</sub>-Cu<sub>2</sub>O catalyst, *Science*, 2020, 368, 513-517. (*Highly Cited Paper*)
2. **Erwei Huang†**, Ivan Orozco†, Pedro J. Ramírez, Zongyuan Liu, Feng Zhang, Mausumi Mahapatra, Slavomir Nemšák, Sanjaya D. Senanayake\*, José A. Rodriguez\*, Ping Liu\*, Selective methane oxidation to methanol on ZnO/Cu<sub>2</sub>O/Cu(111) catalysts: Multiple site-dependent behaviors, *Journal of the American Chemical Society*, 2021, 143, 19018-19032.
3. **Erwei Huang†**, Ning Rui†, Rina Rosales, Ping Liu\*, José A. Rodriguez\*, Activation and conversion of methane to syngas over ZrO<sub>2</sub>/Cu(111) catalysts near room temperature, *Journal of the American Chemical Society*, 2023, 145, 8326-8331.
4. **Erwei Huang†**, Ning Rui†, Rina Rosales, Jindong Kang, Slavomir Nemsak, Sanjaya D. Senanayake, José A. Rodriguez\*, Ping Liu\*, Highly selective methane to methanol conversion on inverse SnO<sub>2</sub>/Cu<sub>2</sub>O/Cu(111) catalysts: Unique properties of SnO<sub>2</sub> nanostructures and the inhibition of the direct oxidative combustion of methane, *ACS Catalysis*, 2022, 12, 11253-11262. (*Journal Cover Article*)
5. **Erwei Huang**, Ping Liu\*, Theoretical perspective of promoting direct methane to methanol conversion at complex metal oxide-metal interfaces, *The Journal of Physical Chemistry Letters*, 2023, 14, 6556-6563. (*Invited Perspective*) (*Journal Cover Article*)
6. Peng Zhai†, Zhenhua Xie†, **Erwei Huang†**, Divakar R. Aireddy†, Haoran Yu, David A. Cullen, Ping Liu\*, Jingguang G. Chen\*, Kunlun Ding\*, CO<sub>2</sub>-mediated oxidative dehydrogenation of propane enabled by Pt-based bimetallic catalysts, *Chem*, 2023, <https://doi.org/10.1016/j.chempr.2023.07.002>.
7. Ning Rui†, **Erwei Huang†**, Jeongjin Kim, Vikram Mehar, Rui Shi, Rina Rosales, Yi Tian, Adrian Hunt, Iradwikanari Waluyo, Sanjaya D. Senanayake, Ping Liu, José A. Rodriguez\*, CO<sub>2</sub> Hydrogenation to methanol over inverse ZrO<sub>2</sub>/Cu(111) catalysts: The fate of methoxy under dry and wet conditions. *The Journal of Physical Chemistry C*, 2022, 126, 14479-14486.
8. Jindong Kang†, Ning Rui†, **Erwei Huang†**, Yi Tian, Mausumi Mahapatra, Rina Rosales, Ivan Orozco, Rui Shi, Sanjaya D. Senanayake, Ping Liu, José A. Rodriguez\*, Surface characterization and methane activation on SnO<sub>x</sub>/Cu<sub>2</sub>O/Cu(111) inverse oxide/metal catalysts. *Physical Chemistry Chemical Physics*, 2021, 23, 17186-17196.
9. **Erwei Huang**, Xiaolong Yao, Weichao Wang, Guangjun Wu, Naijia Guan, Landong Li\*, SnS<sub>2</sub> nanoplates with specific facets exposed for enhanced visible-light-driven photocatalysis, *ChemPhotoChem*, 2017, 1, 60-69.

10. **Erwei Huang**, Juxia Li, Guangjun Wu, Weili Dai, Naijia Guan, Landong Li\*, A simple synthesis of Ga<sub>2</sub>O<sub>3</sub> and GaN nanocrystals, *RSC Advances*, 2017, 7, 47898-47903.

#### **Paper published as coauthor:**

11. Vikram Mehar, **Erwei Huang**, Rui Shi, Ning Rui, Rina Rosales, Iradwikanari Waluyo, Adrian Hunt, Ping Liu, José A. Rodríguez\*, Microscopic investigation of H<sub>2</sub> reduced CuO<sub>x</sub>/Cu(111) and ZnO/CuO<sub>x</sub>/Cu(111) inverse catalysts: STM, AP-XPS and DFT studies, *ACS Catalysis*, 2023, 13, 9857-9870.
12. Zhenhua Xie†, Haoyue Guo†, **Erwei Huang**, Zhongtian Mao, Xiaobo Chen, Ping Liu\*, Jingguang G. Chen\*, Catalytic tandem CO<sub>2</sub>-ethane reactions and hydroformylation for C<sub>3</sub> oxygenate production. *ACS Catalysis*, 2022, 8279-8290.
13. Ivan Orozco, **Erwei Huang**, Mausumi Mahapatra, Jindong Kang, Rui Shi, Slavomír Nemšák, Xiao Tong, Sanjaya D. Senanayake, Ping Liu, José A. Rodríguez\*, Understanding methanol synthesis on inverse ZnO/CuO<sub>x</sub>/Cu catalysts: Stability of CH<sub>3</sub>O species and dynamic nature of the surface. *The Journal of Physical Chemistry C*, 2021, 125, 6673-6683.
14. Ivan Orozco, **Erwei Huang**, Mausumi Mahapatra, Rui Shi, Jindong Kang, Slavomír Nemšák, Sanjaya D. Senanayake, Ping Liu, José A. Rodríguez\*, In situ studies of methanol decomposition over Cu(111) and Cu<sub>2</sub>O/Cu(111): Effects of reactant pressure, surface morphology, and hot spots of active sites. *The Journal of Physical Chemistry C*, 2020, 125 (1), 558-571.
15. Ivan Orozco, **Erwei Huang**, Ramón A Gutiérrez, Zongyuan Liu, Feng Zhang, Mausumi Mahapatra, Jindong Kang, Heath Kersell, Slavomir Nemšák, Pedro J Ramírez, Sanjaya D Senanayake, Ping Liu, José A Rodríguez\*, Hydroxylation of ZnO/Cu(111) inverse catalysts under ambient water vapor and the water-gas shift reaction, *Journal of Physics D: Applied Physics*, 2019, 52, 454001-454008.
16. Bo Ma, **Erwei Huang**, Guangjun Wu, Weili Dai, Naijia Guan, Landong Li\*, Fabrication of WO<sub>2.72</sub>/RGO nano-composites for enhanced photocatalysis, *RSC Advances*, 2017, 7, 2606-2614.
17. Yanhong Lu†, Bo Ma†, Yang Yang, **Erwei Huang**, Zhen Ge, Tengfei Zhang, Suling Zhang, Landong Li\*, Naijia Guan, Yanfeng Ma, Yongsheng Chen\*, High activity of hot electrons from bulk 3D graphene materials for efficient photocatalytic hydrogen production, *Nano Research*, 2017, 10, 1662-1672.

#### **Paper in preparation:**

18. Zhenhua Xie†, **Erwei Huang**†, Samay Garg, Sooyeon Hwang, Ping Liu\*, Jingguang G. Chen\*, CO<sub>2</sub> fixation into carbon nanofibers using electrochemical-thermochemical tandem catalysis, submitted.

### **Press & News Releases**

1. Water is Key in Catalytic Conversion of Methane to Methanol, April 2020
  - <https://www.bnl.gov/newsroom/news.php?a=117178>
2. How Water Promotes Catalysis of Methane to Methanol, August 2020
  - <https://als.lbl.gov/how-water-promotes-catalysis-of-methane-to-methanol/>
3. Converting Methane to Methanol – With and Without Water, November 8, 2021 & June 17, 2022
  - <https://www.bnl.gov/newsroom/news.php?a=119139>
  - <https://www.energy.gov/science/bes/articles/converting-methane-methanol-and-without-water>

## **Talks & Seminars**

1. Erwei Huang, et al., **27<sup>th</sup> North American Catalysis Society Meeting**, Mechanistic Modelling to Control C1 Selectivity Session, May 2022 (*Oral presentation*)
2. Erwei Huang, et al., **Lawrence Berkeley National Laboratory AP-XPS & CS Program Everyone Meeting**, March 2022 (*Invited oral presentation*)
3. Erwei Huang, et al., **American Chemical Society 2021 Fall Meeting**, Natural Gas Catalysis Session, August 2021 (*Oral presentation*)

## **Service & Committee**

### **Professional Service**

*Member:* American Chemical Society (ACS), New York Section of the ACS

*Reviewer:* ACS Journals, Springer Nature Journals, MDPI Journals, etc.

*Volunteer:* Organizational service in the 27<sup>th</sup> North American Catalysis Society Meeting

### **University Service**

*Volunteer:* Recruiting and mentoring new graduates for chemistry program in Stony Brook University; Organizational service for Chemical Research Day in Stony Brook University.

### **Community Service**

*Judge:* Brookhaven National Laboratory Elementary Virtual Science Fair Competition of 2022; Brookhaven National Laboratory Elementary Science Fair Competition of 2023.

## **Professional Skills**

**Research Skills:** Density Functional Theory, Kinetic *Monte Carlo*, Machine Learning

**Teaching Skills:** General Chemistry & Labs, Physical Chemistry, Quantum Chemistry/Mechanics, Computing and Computational Methods in Chemistry and Materials.

**Natural Languages:** Chinese (*native*), English (*Professional working proficiency*)

**Programming Languages:** Python, Fortran, MATLAB, C++

**Scripting Languages:** BASH, SQL

**Professional Certificate:** IBM Data Science

**Advanced Proficiency in Software:** Python Packages (NumPy, pandas, SciPy, Matplotlib, scikit-learn, etc.), Text Editor (Vim)