MIN Boya

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EDUCATION

Xi'an Jiaotong University (C9) Xi'an, China

Master of Power engineering & Engineering Thermophysics *2019.9 - 2022.6*

- **Supervisor:** Prof. GUO, Liejin & Prof. LIU, Maochang
- **Cumulative GPA:** 3.63/4.0
- **Thesis Title:** Synthesis of Multielemental Transition Metal Chalcogenides for Electrocatalytic Water Splitting

Southeast University (Project 985) Nanjing, China

Bachelor of Chemical Engineering & Technology *2015.9 - 2019.9*

- **Supervisor:** Prof. ZHOU, Jiancheng
- **Cumulative GPA:** 3.74/4.0, **Ranking:** 3/26
- **Thesis Title:** Synthesis and Mechanistic Study of Magnesium-Doped g-C_3N_4 for Enhanced Photocatalytic CO_2 Reduction

WORK EXPERIENCE

BYD Auto, Institute of Advanced Technology Xi'an, China

Senior Battery Management System Engineer *2022.7 - Present*

City University of Hong Kong Shenzhen Research Institute Shenzhen, China

Research Assistant (Part Time, Supervisor: Dr. Luoxiao YANG, School of Data Science) *2024.7 - Present*

RESEARCH INTERESTS

- Ai4Science, Electrocatalysis for water splitting, Photocatalytic CO2 reduction, Advanced nanomaterials for catalysis
- Battery management system

RESEARCH PAPERS

1. Wu W†, **Min B†**, Li H, et al. NiFe-LDH coated NiSe/Ni foam as a bifunctional electrocatalyst for overall water splitting. *Reaction Chemistry & Engineering*, 2023, 8(7): 1711-1718.
2. Xue F, Guo X, **Min B**, et al. Unconventional high-index facet of iridium boosts oxygen evolution reaction: how the facet matters. *ACS Catalysis*, 2021, 11(13): 8239-8246.
3. Wu W, Peng L, **Min B**, et al. Activated overall water splitting over a Ni-Fe layered double hydroxide electrocatalyst by V doping and sulfuration. *Applications in Energy and Combustion Science*, 2023, 14: 100148.
4. Liu M, Chen G, **Min B**, et al. Photocatalytic co2 reduction[J]. *Solar-to-Chemical Conversion: Photocatalytic and Photoelectrochemcial Processes*, 2021: 243-267.

RESEARCH EXPERIENCE

1. Battery Remaining Lifetime Analytics Powered by Vision Intelligence

2023.01 - 2024.04

- Pioneered a novel visual intelligence-assisted deep learning approach for battery remaining useful life (RUL) and probabilistic lifetime predictions, developing the Visual Intelligence generated Dilated Vision Transformer (VI-DViT) framework to address key challenges in battery management systems.
- Designed and implemented a three-stage VI-DViT framework comprising neural representation, neural prediction (featuring a Dilated Vision Transformer), and visual decoding stages, inspired by the human visual system's capability to extract simplified neural representations from complex visual information.
- Validated the VI-DViT's effectiveness through extensive computational analyses on two public datasets, demonstrating superior performance in adaptiveness, generalizability, and probabilistic prediction compared to traditional data-driven benchmarks and human visual predictions, advancing the field of universal battery lifetime prediction modeling.

2. Synthesis of Multielemental Transition Metal Chalcogenides for Electrocatalytic Water Splitting

2021.04 - 2022.06

- **2.1 Synthesis and Electrocatalytic Performance of Ternary Transition Metal Sulfide NiFeV-S/NF**
  - Developed a ternary transition metal sulfide NiFeV-S/NF catalyst via a two-step hydrothermal synthesis method to address the limitations of NiFe-LDH catalysts.
  - Demonstrated superior electrocatalytic activity with overpotentials of 211 mV and 127 mV for OER and HER respectively, at a current density of 10 mA cm^{-2} in 1 M KOH.
  - Fabricated a NiFeV-S/NF//NiFeV-S/NF electrolyzer for overall water splitting, demonstrating outstanding performance with a low cell voltage of 1.573 V at 10 mA cm^{-2}.
- **2.2 Synthesis and Electrocatalytic Performance of NiSe@NiFe-LDH/NF Heterojunction Catalyst**
  - Conceptualized and fabricated a novel core-shell heterostructured bifunctional electrocatalyst (NiSe@NiFe-LDH/NF), combining the high conductivity of NiSe with the catalytic activity of NiFe-LDH.
  - Achieved exceptional electrocatalytic activity in alkaline conditions, used as both cathode and anode for electrocatalytic water splittingrequiring only 1.560 V to deliver a current density of 10 mA cm^{-2}, surpassing the performance of previous catalysts.
  - Conducted long-term stability tests to verify the durability enhancements provided by the core-shell architecture, contributing to the design of efficient and stable non-noble metal bifunctional catalysts.

3. Synthesis of Pd@Ir and Investigation of Ir Facet Effects on OER Activity

2020.05 - 2021.06

- Developed a facile seed-mediated growth method to synthesize Pd@Ir core-shell nanocatalysts with controlled morphologies, employing facet-specific inhibitors and reaction kinetics control to tune the surface structure.
- Systematically investigated the structure-activity relationship of Ir-based catalysts by fabricating three Pd@Ir nanostructures with identical size but distinct surface facets, addressing the scalability limitations of Ir-based catalysts.
- Elucidated the facet-dependent OER mechanism through comprehensive electrochemical characterization and Density Functional Theory (DFT) calculations, revealing superior catalytic activity and durability of high-index faceted Pd@Ir nanostructures.
- Contributed to the publication "Unconventional high-index facet of Iridium boosts oxygen evolution reaction: How the Facet Matters" as the third author.

4. Rational Design of Co-Cu/TiO_2 Photocatalyst for Efficient CO_2 Conversion via MOF-Templated Synthesis

2017.10 - 2019.03

- Developed a MOF-templated synthesis strategy using MIL-125(Ti) to fabricate hierarchically porous Co-Cu co-doped TiO_2 photocatalyst with precisely controlled surface composition and morphology.
- Elucidated the synergistic effect of Cu and Co dopants on charge carrier dynamics: Cu facilitates efficient photogenerated electron capture and separation, while Co acts as a hole trap and promotes H^+ intermediate formation, enhancing C2+ product selectivity.
- Demonstrated superior photocatalytic performance in CO_2 reduction with H_2O, achieving high selectivity towards value-added C1-C3 products (CO, CH_4, C_2H_6, and C_3H_8) under simulated solar irradiation.

AWARD

- First Prize, Eastern China Region, 2nd National Undergraduate Chemical Engineering Experiment Competition
- President's Scholarship, Southeast University (Top 1%)
- Dalian Institute of Chemical Physics Scholarship (Top 5%)
- Jiangsu Electric Power Scholarship (Top 5%)
- Special Academic Scholarship, Xi'an Jiaotong University (Top 10%)

ENGLISH & GRE TESTS

- **GRE General Test:** Quantitative: 170 Verbal: 160 Analytical Writing: 4.0, Test Date: September 9, 2024
- **CET6:** 481, Test Date: April 9, 2016

Skill

- **Proficient in operation and data analysis:** TEM, SEM, XRD, FTIR & UV-vis spectroscopy
- **Familiar with basic functions:** Aspen Plus, 3D MAX, ChemDraw, Origin
- **LLM Tools:** GPT-4, Claude 3.5, Research productivity enhancement, Coding assistance