

## Hui PAN (潘暉)

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Dr. Hui Pan is a professor and the associate director in the Institute of Applied Physics and Materials Engineering at the University of Macau. He got his PhD degree in Physics from the National University of Singapore in 2006. From 2006 to 2013, he worked at National University of Singapore as a Research Fellow, Oak Ridge National Laboratory (USA) as a Postdoctoral Fellow, and Institute of High Performance Computing (Singapore) as a Senior Scientist, respectively. He joined the University of Macau as an assistant professor in 2013. Dr. Pan was promoted to associate professor in 2017 and full professor in 2020. In his research, a combined computational and experimental method is used to design and fabricate novel nanomaterials for applications in green energy and environments (such as electro-/photo-catalysis, water splitting, CO<sub>2</sub>/NO<sub>3</sub> reduction, and fuel cells), electronic/quantum devices, and spintronics. He has published more than **280** papers in international peer-reviewed journals, such as Phys. Rev. Lett. and Adv. Energy Mater.. The total citation is ~ **15,200 (google scholar)**. Additionally, he is the author of **5 book chapters** and the inventor of **4 USA** and **7 China** patents. His present h-index is **66 (google scholar)**. (updated in Dec. 2023).

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## Education

- Ph.D. in Physics, National University of Singapore, Singapore (2006)
- Bachelor in Electronic Materials and Devices, Xidian University, Xi'an, China (1997)

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## Professional Experience

- Associate Director of the Institute of Applied Physics and Materials Engineering, University of Macau, Macau (05/2022 – Present)
- Professor, University of Macau, Macau (08/2020 – Present)
- Founding Head of Department of Physics and Chemistry, Faculty of Science and Technology, University of Macau, Macau (08/2018 – 06/2022)
- Associate Professor, University of Macau, Macau (08/2017 – 08/2020)
- Assistant Professor, University of Macau, Macau (08/2013 – 08/2017)
- Senior Scientist I, Institute of High Performance Computing, Singapore (03/2013 – 08/20213)
- Scientist II, Institute of High Performance Computing, Singapore (04/2012 – 03/2013)
- Scientist I, Institute of High Performance Computing, Singapore (05/2009 – 03/2012)
- Postdoctoral Fellow, Oak Ridge National Laboratory, USA (04/2008 – 04/2009)
- Research Fellow, National University of Singapore, Singapore (01/2006 – 03/2008)

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## Teaching

### B.Sc. Courses

1. Solid State Physics

### PhD Courses

## 1. Advanced Instrumentation for Materials Characterization

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### Research

#### Research Interests

- Energy harvesting and storage (photocatalysis, electrocatalysis, CO<sub>2</sub>/NO<sub>3</sub> reduction, fuel cell, hydrogen production, solar cell, and supercapacitor)
- Spintronics
- Nanodevices (ReRAM and PRAM)
- Fabrication and first-principles design of materials
- Condensed Matter Physics

#### Research Grants

##### Grants from Macau/Shenzhen Government:

- Science and Technology Development Fund from Macao SAR (FDCT- 0050/2023/RIB2) (from 01/2024 to 01/2027)
- Science and Technology Development Fund from Macao SAR (FDCT- 0023/2023/AFJ) (from 12/2023 to 12/2026)
- Science and Technology Development Fund from Macao SAR (FDCT- 0111/2022/A2) (from 12/2022 to 12/2025)
- Shenzhen-Hong Kong-Macao Science and Technology Research Programme (Type C) (SGDX20210823103803017) (from 04/2022 to 04/2024)
- Science and Technology Development Fund from Macao SAR (FDCT- 0028/2021/APD) (from 04/2022 to 03/2024)
- Science and Technology Development Fund from Macao SAR (FDCT- 0081/2019/AMJ) (from 01/2021 to 12/2023)
- Science and Technology Development Fund from Macao SAR (FDCT- 0154/2019/A3) (from 05/2020 to 05/2023)
- Science and Technology Development Fund from Macao SAR (FDCT- 0102/2019/A2) (from 08/2019 to 07/2022)
- Science and Technology Development Fund from Macao SAR (FDCT- 0035/2019/AGJ) (from 01/2020 to 12/2021)
- Science and Technology Development Fund from Macao SAR (FDCT- 110/2014/SB) (from 11/2015 to 10/2018)
- Science and Technology Development Fund from Macao SAR (FDCT-132/2014/A3) (from 06/2015 to 05/2018)
- Science and Technology Development Fund from Macao SAR (FDCT-062/2014/A) (from 01/2015 to 12/2017)
- Science and Technology Development Fund from Macao SAR (FDCT-076/2013/A) (from 01/2014 to 12/2014)

##### Grants from University of Macau:

- Multi-year research grant at University of Macau (MYRG-GRG2023-00010-IAPME) (from 01/2024 to 12/2025)

- Multi-year research grant at University of Macau (MYRG2022-00026-IAPME) (from 01/2023 to 12/2024)
- Multi-year research grant at University of Macau (MYRG2018-00003-IAPME) (from 01/2019 to 12/2021)
- Multi-year research grant at University of Macau (MYRG2017-00027-FST) (from 01/2018 to 12/2020)
- Multi-year research grant at University of Macau (MYRG2015-00017-FST) (from 04/2015 to 09/2018)
- Start-up research grant at University of Macau (SRG2013-00033-FST) (from 10/2013 to 09/2015)
- Multi-year research grant at University of Macau (MYRG2014-000159-FST) (from 05/2014 to 04/2017)

## Research Laboratory

Catalysis and Energy Materials Laboratory: N23-2005/6

### Current Members

#### *PhD and UG Students*

Mr. Lun Li (PhD student, 08/2023 ~ present)  
 Mr. Youpeng Chao (PhD student, 01/2023 ~ present)  
 Mr. Yiqian Chen (Undergraduate, 10/2022 ~ present)  
 Mr. Chunfa Liu (PhD student, 08/2022 ~ present)  
 Mr. Shuyang Peng (PhD student, 08/2022 ~ present)  
 Mr. Yutong Li (PhD student, 08/2022 ~ present)  
 Mr. Zichao Yu (PhD student, 08/2022 ~ present)  
 Mr. Jiachen Li (Undergraduate, 10/2021 ~ present)  
 Mr. Zhongheng Li (PhD student, 08/2021 ~ present)  
 Ms. Lulu Qiao (PhD student, 08/2021 ~ present)  
 Ms. Lihong Yin (PhD student, 08/2021 ~ present)  
 Mr. Keyu An (PhD student, 08/2021 ~ present)  
 Mr. Xuanwei Dai (Undergraduate, 10/2020 ~ present)  
 Mr. Haoyun Bai (PhD student, 08/2020 ~ present)

#### *Research Staffs:*

Dr. Katherine Weng I CHIO  
 Dr. Wenhao GU  
 Dr. Xingshuai LYV  
 Dr. Di LIU  
 Dr. Jinxian FENG  
 Dr. Yuxuan XIAO

### Former Members

#### *PhD Graduates*

Dr. Yuanju Qu, Roger (PhD study from 08/2014 ~ 08/2017)  
 Dr. Ziqian Ma, Mason (PhD study from 08/2014 ~ 04/2018)  
 Dr. Mengmeng Shao (PhD study from 08/2016 ~ 06/2019)  
 Dr. Wenzhou Chen (PhD study from 08/2016 ~ 06/2019)  
 Dr. Xiongwei Zhong (PhD study from 08/2016 ~ 10/2019)

Dr. Lujie Cao (PhD study from 01/2016 ~ 01/2020)  
Dr. Mingyang Yang (PhD study from 01/2016 ~ 01/2020)  
Dr. Qing Zhu (PhD study from 08/2017 ~ 07/2020)  
Dr. Yangfan Shao (PhD study from 08/2016 ~ 07/2020)  
Dr. Rui Tong (PhD study from 08/2017 ~ 08/2020)  
Dr. Dong Liu (PhD study from 01/2019 ~ 08/2021)  
Dr. Youchao Kong (PhD study from 08/2018 ~ 08/2021)  
Dr. Zhiqin Ying (PhD study from 08/2018 ~ 10/2021)  
Dr. Chon Chio Leong, Roy (PhD study from 08/2014 ~ 12/2021)  
Dr. Xinyu Du (PhD study from 08/2019 ~ 06/2022)  
Dr. Haoqiang Ai (PhD study from 08/2019 ~ 06/2022)  
Dr. Jiazhong Geng (PhD study from 08/2019 ~ 06/2022)  
Dr. Feifei Li (PhD study from 08/2019 ~ 06/2022)  
Dr. Mingpeng Chen (PhD study from 08/2019 ~ 06/2022)  
Dr. Kin Long Ao (PhD study from 08/ 2017 ~ 10/2022)  
Dr. Di Liu (PhD study 08/2020 ~ 07/2023)  
Dr. Jinxian Feng (PhD study 08/2020 ~ 07/2023)  
Dr. Bowen Li (PhD study 08/2019 ~ 07/2023)  
Dr. Pengfei Zhou (PhD study 08/2019 ~ 07/2023)

### ***Undergraduates***

Mr. Shijie Wen, Jack (graduated in 2016)  
Mr. Yifeng Xie (graduated in 2018)  
Mr. Jialin Li (graduated in 2018)  
Mr. Ye Ke (graduated in 2018)  
Mr. Jer Shiuh Phooh (graduated in 2019)  
Ms. Ziqin Dai, Helen (graduated in 2019)  
Mr. Shengjie Ding (graduated in 2020)  
Mr. Yunxiao Liu (graduated in 2023)

### ***Research Staffs***

Mr. Di Liu (Postdoctoral Fellow in my Group)  
Dr. Zhen Li (@Shandong Normal University, Shandong, China)  
Dr. Chi Fong Wong  
Dr. Tianwei He (@ Yunnan University, China)  
Dr. Pengcheng Zhao (@Northeast Petroleum University)  
Dr. Chao Peng (@WuYi University, Jiangmen, Guangdong, China)  
Mr. Ke-Yu An (currently PhD student in my Group)  
Dr. Zhongbing Pan (@ Lingbo University, Lingbo, Zhejiang, China)  
Dr. Xuejian Du (@Shandong Normal University, Shandong, China)  
Dr. Roger Yuanju QU (@Linkoping University, Sweden)  
Mr. Wenhao Gu (@Nanjing University of Information Science & Technology)  
Dr. Qingchun ZHANG (@Southwest University of Science and Technology)  
Mr. Chunfa LIU (currently PhD student in my Group)  
Dr. Yuyun CHEN (@ Guangxi Nationality University)  
Dr. Siying SHEN  
Dr. Songbo CHEN (@ Shenzhen University)  
Dr. Yuling ZHOU (@ Shenzhen University)  
Dr. Yuzhe LIU (@ Shenzhen University)  
Dr. Shangpeng LI (@ Shenzhen University)

Dr. Lianyi SHAO (@ Guangzhou University of Technology)

**Links**

<https://iapme.um.edu.mo/people/academic-staff/pan-hui/>

<https://www.fst.um.edu.mo/pc/acadstaff.html>

<https://publons.com/researcher/2877040/hui-pan/>

<http://scholar.google.com.sg/citations?user=vmGv38sAAAAJ&hl=en>

<https://orcid.org/0000-0002-6515-4970>

<https://www.scopus.com/authid/detail.uri?authorId=57192713115>

## Patent List:

1. **Hui Pan** and Lun Li, Preparation method and application of a high entropy electrocatalyst, submitted.
2. **Hui Pan**, Chunfa Liu, Hongchao Liu, and Shuangpeng Wang, A facile method for the preparation of low-cost, efficient and stable transition metal-based OER electrocatalysts, submitted.
3. **Hui Pan** and Jinxing Feng, Low-cost and high-performance electrocatalyst based on surface Sn incorporation brass for CO<sub>2</sub>-to-formate electrochemical reduction, **Submitted**.
4. **Hui Pan**, Chunfa Liu, and Hongchao Liu, Bi-functional and low-cost electrocatalyst for high-efficient and stable full-water-splitting: FeCoCrCuO<sub>x</sub>@CF, **Submitted**.
5. **Hui Pan**, Shuyang Peng, and Kin Ho Lo, Low Cost, High Efficiency and Stability Industrial Si-based Photoelectrochemical Materials for Water Splitting, 11/07/2023, **submitted**.
6. **Hui Pan**, Rucheng Wu, and Di Liu, A simple way to make Si-based photoelectrode with active layer for Solar-driven water splitting with high Saturation Photocurrent. 31/10/2022, **China Patent Application No. "202211344350.0"**.
7. **Hui Pan**, Di Liu, Shuangpeng Wang, Lulu Qiao, and Kar-Wei Ng, Low-cost electrocatalyst for high-efficient and stable nitrate reduction reaction. 28/07/2022, **China Patent Application No. "202210554712.2"**.
8. **Hui Pan**, Pengfei Zhou, Shuangpeng Wang, and Kar-Wei Ng, Bi-functional and low-cost electrocatalyst for high-efficient and stable full-water-splitting: stainless steel treated by simple anodization in saline. 16/06/2021, **China Patent Application No. "202110856193.0"**.
9. **Hui Pan**, Dong Liu and Guichuang Xing, "Bi-functional and low-cost electrocatalyst for high-efficient and stable full-water-splitting: Cr-doped NiS<sub>x</sub>", 13/12/2022, **Granted, China Patent No. "ZL201910758027. X"**.
10. **Hui Pan** and Mengmeng Shao, "MoS<sub>2</sub>/Mo<sub>2</sub>C/CdS: a super-efficient photocatalyst for hydrogen evolution", 30/08/2020, **Granted, China Patent No. "ZL201811323293.1"**.
11. **Hui Pan** and Xiongwei Zhong, "Carbon-Coated N-rich C<sub>3</sub>N<sub>4</sub> as an anode material for Lithium Battery", 12/02/2018, **Granted, China Patent No. ZL 201810148357.2**.
12. **Hui Pan** and Yuanju Qu, "TiS<sub>2</sub>: an excellent cathodic electrocatalyst for hydrogen production in electrolysis of water", 26/09/2017, **Granted. China Patent No. ZL 201710917164.4**.
13. Soo Jin Chua, Hailong Zhou, Jianyi Lin, **Hui Pan**, "Method of ZnO Film Grown on the Epitaxial Lateral Overgrowth GaN Template", 04/25/2006, **US Provisional Patent Application No. 60/794,775**.
14. **Hui Pan**, Jianyi Lin, Yuan Ping Feng, "Supercapacitor from Carbon Tubes-in-Tube Nanostructures", 03/01/2006, **US Provisional Patent Application No. 60/777,547**.
15. **Hui Pan**, Jianyi Lin, Yuan Ping Feng, "Synthesis of Mg doped ZnO Nanowires and Their Applications to Optical Devices and Hydrogen Storage", 07/13/2005, **US Provisional Patent Application No. 60/698,476**.
16. **Hui Pan**, Jianyi Lin, Jun Ding, Yuan Ping Feng, "Single Crystal Growth of Magnetic Nanowires", 11/02/2004, **US Provisional Patent Application No. 60/607,111**.

### **Recently Published/Accepted journal papers (\*Corresponding Author):**

1. Haoyun Bai, Zhichao Yu, Jinxian Feng, Di Liu, Weiqi Li, and Hui Pan\*,  $\text{Co}_3\text{X}_8$  (X= Cl and Br): multiple phases and magnetic properties in Kagome lattice. *Nanoscale* (2024).
2. Shuyang Peng, Di Liu, Keyu An, Zhiqin Ying, Mingpeng Chen, Jinxian Feng, Kin Ho Lo\*, and **Hui Pan\***, n-Si/SiO<sub>x</sub>/CoO<sub>x</sub>-Mo Photoanode for Efficient Photoelectrochemical Water Oxidation. *Small* (2024).
3. Jinxian Feng, Lulu Qiao, Chunfa Liu, Pengfei Zhou, Wenlin Feng, and Hui Pan, Triggering efficient reconstructions of Co/Fe dual-metal incorporated Ni hydroxide by phosphate additives for electrochemical hydrogen and oxygen evolutions. *J. Col. Inter. Sci.* (2024).
4. Lulu Qiao, Di Liu, Anquan Zhu, Jinxian Feng, Pengfei Zhou, Chunfa Liu, Kar Wei Ng\*, and **Hui Pan\***, Nickel-facilitated In-situ Surface Reconstruction on Spinel Co<sub>3</sub>O<sub>4</sub> for Enhanced Electrochemical Nitrate Reduction to Ammonia. *Appl. Catal. B* 340, 123219 (2024).
5. Chunfa Liu, Jinxian Feng, Pengfei Zhou, Dong Liu, Lulu Qiao, Di Liu, Youpeng Cao, Shi-Chen Su, Hongchao Liu\*, and Hui Pan\*, Multi-metal interaction boosts reconstructed FeCoCrCuO<sub>x</sub>@CF toward efficient alkaline water electrolysis under large current density. *Chem. Eng. J.* 476, 146710 (2023).
6. Haoyun Bai, Di Liu, and **Hui Pan\***, LaOMS<sub>2</sub> (M= Ti, V, and Cr): novel crystal spin valves without contact. *Mater. Horizon* 10, 5126-5132 (2023).
7. Qingchun Zhang, Di Liu, Yaping Zhang, Zhiliang Guo\*, Minpeng Chen, Yuyun Chen, Bo Jin, Yingze Song\*, and **Hui Pan\***, Insight into coupled Ni-Co dual-metal atom catalysts for efficient synergistic electrochemical CO<sub>2</sub> reduction. *J. Energy Chem* 87, 509-517 (2023).
8. Zhichao Yu, Bowen Li, Haoyun Bai, and **Hui Pan\***, Two-dimensional Janus perovskite oxynitrides as active photocatalysts for overall water splitting with ferroelectric modulation. *J. Chem. Mater. A* 11, 19074-19082 (2023).
9. Xingshuai Lv, Junxian Liu, Liangzhi Kou\*, Kar Wei Ng\*, Shuangpeng Wang\*, Thomas Frauenheim\*, and **Hui Pan\***, Three-Dimensional Dual-Site Catalysts for Industrial Ammonia Synthesis at Dramatically Decreased Temperatures and Pressures. *ACS Catal.* 13, 13561-13568 (2023).
10. Lihong Yin, Zhiqiang Li, Jinxian Feng, Pengfei Zhou, Lulu Qiao, Di Liu, Zhibin Yi, Weng Fai Ip\*, Guangfu Luo\*, and **Hui Pan\***, Facile and Stable CuInO<sub>2</sub> Nanoparticles for Efficient Electrochemical CO<sub>2</sub> Reduction. *ACS Appl. Mater. Inter.* 15, 47135–47144 (2023).
11. Yuling Zhuo, Dong Liu\*, Lulu Qiao, Songbo Chen, Jianxi Lu, Weng Fai Ip\*, **Hui Pan\***, and Zhenbo Wang\*, Ultrafast Room-Temperature Synthesis of Large-Scale, Low-Cost, and Highly Active Ni– Fe Based Electrodes toward Industrialized Seawater Oxidation. *Adv. Energy Mater.* 13, 2301921 (2023).
12. Shiyang Shen, Haoqiang Ai, Yandong Ma, Haoyun Bai, Xuejian Du, Feifei Li, and **Hui Pan\***, In-Plane Ferroelectric Monolayer TiNbX<sub>4</sub>O and Its Application in Bulk Photovoltaic Effect. *Appl. Phys. Lett.* 123, 052901 (2023).
13. Songbo Chen, Dong Liu\*, Pengfei Zhou, Lulu Qiao, Keyu An, Yuling Zhuo, Jianxi Lu, Qizhen Liu, Weng Fai Ip\*, Zhenbo Wang\*, and **Hui Pan\***, Multi-metal electrocatalyst with crystalline/amorphous structure for enhanced alkaline water/seawater hydrogen evolution. *J. Colloid Inter. Sci.* 650, 807-815 (2023).
14. Di Liu, Lulu Qiao, Shuyang Peng, Haoyun Bai, Chunfa Liu, Weng Fai Ip, Kin Ho Lo, Hongchao Liu, Kar Wei Ng, Shuangpeng Wang\*, Xiaozhan Yang, and **Hui Pan\***, Recent advances in electrocatalysts for efficient nitrate reduction to ammonia. *Adv. Funct. Mater.* 33, 2303480 (2023).

15. Pengfei Zhou, Songbo Chen, Haoyun Bai, Chunfa Liu, Jinxian Feng, Di Liu, Lulu Qiao, Shuangpeng Wang\*, and **Hui Pan\***, Facile formation of Zn-incorporated NiFe layered double hydroxide as highly-efficient oxygen evolution catalyst. *J. Colloid Inter. Sci.* **647**, 65-72 (2023).
16. Yutong Li, Bowen Li, Haoyun Bai, Zhichao Yu, Chi Tat Kwok\* and **Hui Pan\***, Magnetic and Electronic Properties of 2D MSX (M = Ti, V, Co and Ni, X = Br and I), *Phys. Chem. Chem. Phys.* **25**, 18691 - 18697 (2023).
17. Liming Deng, Shuyi Liu, Di Liu, Yu-Ming Chang, Linlin Li, Chunsheng Li, Yan Sun, Feng Hu\*, Han-Yi Chen, **Hui Pan\***, and Shengjie Peng\*, Activity-Stability Balance: The Role of Electron Supply Effect of Support in Acidic Oxygen Evolution. *Small*, **2302238** (2023).
18. Chengqun Xu\*, Haiyang Liu, Dongyu Wang, Dezhi Li, Ying Zhang, Xiaolu Liu, Jingyao Huang, Shengquan Wu, Donghua Fan, Hongguang Liu\*, and **Hui Pan\***, Molten-salt assisted synthesis of Polymeric Carbon Nitride-based photocatalyst for enhanced photocatalytic activity under green light irradiation. *Appl. Catal. B* **334**, 122835 (2023).
19. Jinxian Feng, Junyan Li, Lulu Qiao, Dong Liu, Pengfei Zhou, Jun Ni and **Hui Pan\***, Reconstructed Anti-Poisoning Surface for Enhanced Electrochemical CO<sub>2</sub> Reduction on Cu-Incorporated ZnO. *Appl. Catal. B* **330**, 122665 (2023).
20. Mingpeng Chen, Di Liu, Lulu Qiao, Pengfei Zhou, Jinxian Feng, Kar Wei Ng, Qingju Liu\*, Shuangpeng Wang\* and **Hui Pan\***, In-situ/operando Raman techniques for in-depth understanding on electrocatalysis. *Chem. Eng. J.* **461**, 141939 (2023).
21. Di Liu, Lulu Qiao, Yuyun Chen, Pengfei Zhou, Jinxian Feng, Chon Chio Leong, Kar Wei Ng, Shengjie Peng, Shuangpeng Wang\*, Weng Fai Ip, and **Hui Pan\***, Electrocatalytic Reduction of Nitrate to Ammonia on Low-Cost Manganese-incorporated Co<sub>3</sub>O<sub>4</sub> nanotubes. *Appl. Catal. B* **324**, 122293 (2023).
22. Jinxian Feng, Lulu Qiao, Pengfei Zhou, Haoyun Bai, Chunfa Liu, Chon Chio Leong, Yu-Yun Chen, Weng Fai Ip, Jun Ni, and **Hui Pan\***, Nanocrystalline CoO<sub>x</sub> glass for highly-efficient alkaline hydrogen evolution reaction. *J. Mater. Chem. A* **11**, 316-329 (2023).
23. Jiwei Li, Junli Xu, Jia Zhao, Yixin Fang, Congcong Du, Xingyu Ding, Jinyu Ye, Yifei Sun, Kelvin HL Zhang, Shunji Xie, Jianyu Huang, Mikhail Salaev, Grigory Mamontov, Weng Fai Ip, **Hui Pan**, Sen Lin\*, Haifeng Xiong\*, Modulation of oxygen-etching for generating nickel single atoms for efficient electroreduction of CO<sub>2</sub> to syngas (CO/H<sub>2</sub>). *J. Catal.* **421**, 332-341 (2023).
24. Jinxian Feng, Xiongwei Zhong, Mingpeng Chen, Pengfei Zhou, Lulu Qiao, Haoyun Bai, Dong Liu, Di Liu, Yu-Yun Chen, Weng Fai Ip, Shi Chen, Jun Ni, Detao Liu, and **Hui Pan\***, Iron-incorporated Defective Graphite by in-situ Electrochemical Oxidization for Oxygen Evolution Reaction. *J. Power Sources* **561**, 232700 (2023).
25. Pengfei Zhou, Haoyun Bai, Jinxian Feng, Di Liu, Lulu Qiao, Chunfa Liu, Shuang-Peng Wang\*, and **Hui Pan\***, Recent Progress on bulk Fe-based alloy for industrial alkaline water electrolysis. *J. Mater. Chem. A* **11**, 1551 - 1574 (2023).
26. Haoyun Bai, Jinxian Feng, Di Liu, Pengfei Zhou, Rucheng Wu, Chi Tat Kwok, Weng Fai Ip, Wenlin Feng, Xulei Sui, Hongchao Liu\*, and **Hui Pan\***, Advances in Spin Catalysts for Oxygen Evolution and Reduction Reactions, *Small* **19**, 2205638 (2023). (Hot Topic: Magnetic Materials)
27. Lulu Qiao, Anquan Zhu, Di Liu, Jinxian Feng, Yuyun Chen, Mingpeng Chen, Pengfei Zhou, Lihong Yin, Rucheng Wu, Kar Wei Ng\*, and **Hui Pan\***, Crystalline phosphides/amorphous oxides composite for energy-saving hydrogen production assisted by efficient urea oxidation reaction. *Chem. Eng. J* **454**, 140380 (2023).
28. Chengqun Xu\*, Dezhi Li, Haiyang Liu, Dongyu Wang, Xiaolu Liu, Shiyin Lin, Yuchen Yang, Donghua Fan, and **Hui Pan\***, Construction of 1D/0D CdS nanorods/Ti<sub>3</sub>C<sub>2</sub> QDs Schottky heterojunctions for efficient photocatalysis. *J. Environ. Chem. Eng.* **11**, 109191 (2023).
29. Di Liu, Jia Zhao, Youchao Kong, Haoqiang Ai, Haoyun Bai, Chon Chio Leong, Kin Ho Lo, Shuangpeng Wang\*, Weng Fai Ip, Sen Lin, and **Hui Pan\***, Comprehensive Mechanism for CO



- Electroreduction on Dual-Atom-Catalyst-Anchored N-Doped Graphene. *ChemPhysChem* **24**, e202200937 (2023).
30. Bowen Li, Haoyun Bai, Shiyong Shen, Kar Wei Ng\*, and **Hui Pan\***, Tunable Interstitial Anionic Electrons in Layered MXenes. *J. Phys. Condens. Matter* **35**, 034001 (2023).
  31. Pengfei Zhou, Po Kee Wong, Pengda Niu, Mingpeng Chen, Chi Tat Kwok, Yuxin Tang\*, Ruidi Li\*, Shuangpeng Wang\*, and **Hui Pan\***, Anodized AlCoCrFeNi high-entropy alloy for alkaline water electrolysis with ultra-high performance. *Sci. China Mater.* **66**, 1033-1041 (2023).
  32. Rui Wang, Yang Yang, Xiaocheng Xu, Sijie Chen, Alex Trukhanov, Ruiying Wang, Lianyi Shao\*, Xia Lu\*, Hui Pan\*, and Zhipeng Sun\*, Interface engineering and heterometal-doped FeOOH/Ga-Ni<sub>3</sub>S<sub>2</sub> nanosheet arrays for efficient electrocatalytic oxygen evolution. *Inorg. Chem Front.* **10**, 1348-1356 (2023).
  33. Mingrui Shao, Di Liu, Jinxuan Lu, Xiaofei Zhao, Jing Yu, Chao Zhang, Baoyuan Man\*, **Hui Pan\***, and Zhen Li\*, Giant enhancement of the initial SERS activity for plasmonic nanostructures via pyroelectric PMN-PT. *Nanoscale Hori.* **8**, 948-957 (2023).
  34. Baoqiang Du, Jibing Tan, Chang Ji, Mingrui Shao, Xiaofei Zhao, Jing Yu, Chao Zhang, Chuansong Chen, **Hui Pan\***, Baoyuan Man\*, and Zhen Li\*, Study of thermoelectric enhanced SERS and photocatalysis with ZnO-metal nanorod arrays. *Nano Research* **16**, 5427-5435 (2023).
  35. Long-Ji Yuan, Xu-Lei Sui\*, Chang Liu, Yu-Ling Zhuo, Qi Li, **Hui Pan**, and Zhen-Bo Wang\*, Electrocatalysis Mechanism and Structure–Activity Relationship of Atomically Dispersed Metal-Nitrogen-Carbon Catalysts for Electrocatalytic Reactions. *Small Methods* **7**, 2201524 (2023).
  36. Zhiqin Ying, Xi Yang, Jingming Zheng, Jingsong Sun, Jingwei Xiu, Yudong Zhu, Xinlong Wang, Ying Chen, Xin Li, Jiang Sheng, Chunhui Shou, Yuheng Zeng, **Hui Pan\***, Jichun Ye\*, and Zhubing He\*, Bathocuproine: Ag Complex Functionalized Tunneling Junction for Efficient Monolithic Perovskite/TOPCon Silicon Tandem Solar Cell. *Solar RRL* **6**, 2200793 (2022).
  37. Yang Li, Jin-Feng Liao\*, **Hui Pan\***, and Guichuan Xing\*, Interfacial Engineering for High-Performance PTAA-Based Inverted 3D Perovskite Solar Cells. *Solar RRL* **6**, 2200647 (2022).
  38. Haoyun Bai, Di Liu, Pengfei Zhou, Jinxian Feng, Xulei Sui, Yunhao Lu, Hongchao Liu\* and **Hui Pan\***, Spin evolution and flip in the oxygen reduction reaction: a theoretical study of Cu(Ni)XP<sub>2</sub>S<sub>6</sub> (X = In, Bi and Cr). *J. Mater. Chem. A* **10**, 25262-25271 (2022).
  39. Chengqun Xu\*, Xiaolu Liu, Haiyang Liu, Dezhi Li, Yuchen Yang, Shiyin Lin, Donghua Fan and **Hui Pan\***, Molecular engineering for constructing a D–A system and enhancing delocalization in g-C<sub>3</sub>N<sub>4</sub> with superior photocatalytic activity. *J. Mater. Chem. A* **10**, 21031-21043 (2022).
  40. Junnan Song, Sheng Zhao, Di Liu, Yixing Xiong, Feng Hu, Linlin Li, Lei Li, **Hui Pan\***, and Shengjie Peng\*, Plasma-induced defect engineering of porous metal–organic framework nanosheet arrays for efficient water splitting. *Chem. Commun.* **58**, 9662-9665 (2022).
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### **Book Chapters:**

1. **Hui Pan**, Nanotubes for Energy Storage, “**Nanofabrication and its Application in Renewable Energy**”, edited by G. Zhang and N. Manjooran, The Royal Society of Chemistry 2014, pp. 120-197. (invited review)
2. **Hui Pan**, Progress on the Theoretical Study of Two-Dimensional MoS<sub>2</sub> Monolayer and Nanoribbon, “**MoS<sub>2</sub> – Materials, Physics, and Devices**”, edited by Z. M. Wang, Springer 2014, pp. 1-35. (invited review)
3. Yuan Ping Feng, **Hui Pan**, Rongqin Wu, Lei Shen, Jun Ding, Jiabao Yi, Yihong Wu, Ferromagnetism in Semiconductors Doped with Non-Magnetic Elements, “**Spintronics: Materials, Applications and Devices**”, edited by G. C. Lombardi and G. E. Bianchi, 2009, pp. 59-78. (invited review)
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5. Yuan Ping Feng, **Hui Pan**, Rongqin Wu, Guowen Peng, Jianyi Lin, *Ab Initio* study of Functionalized Nanotubes, “*Hard Nanomaterials*”, edited by Dr. H. S. Nalwa, 2006. (invited review)

## International Conference/Workshop Talk List:

1. **Hui Pan**, Electrochemical Production of Green Hydrogen: from lab to industry. **Keynote talk**, the 4<sup>th</sup> international Conference on Advanced Materials and Clean Energy, Feb. 17, 2023.
2. **Hui Pan**, Electrocatalysts for Green Hydrogen Production: Design, Synthesis, and Industrial Fabrication, **Keynote talk**, The Asian Consortium on Computational Materials Science – Global Research Center (ACCMS-GRC), Webinar, Dec. 08, 2022.
3. **Hui Pan**, Electrocatalysts: from Design, Fabrication to Industrial Production. **Invited talk**, International Conference of Green Energy and Catalysts, Huizhou, Nov. 19, 2022.
4. **Hui Pan**, Design of 2D materials for Nanodevices. **Invited talk**, 2022 International Conference on Low-Dimensional Semiconductor Materials and Device Physics, Chongqing, Nov. 19, 2022.
5. **Hui Pan**, Electrocatalysts: from Design, Fabrication to Industrial Production. **Invited talk**, 1<sup>st</sup> International Symposium on Advanced Functional Materials, Hangzhou, Nov. 14, 2022.
6. **Hui Pan**, Electrolysis of Water: Design, Fabrication to Industrial Production of Electrocatalysts. **Invited talk**, Zhejiang Technological University, Oct. 11, 2022.
7. **Hui Pan**, Water Electrolysis - Design, Fabrication to Industrial Production of Electrocatalysts. **Invited talk**, China South Normal University, Sep. 15, 2022.
8. **Hui Pan**, Electrolysis of Water: Design, Fabrication and Industrial Production of Electrocatalysts. **Invited talk**, Donghua University, Aug. 02, 2022.
9. **Hui Pan**, Design and Fabrication of Metal compounds for Electrolysis of Water, **Keynote talk**, 2022 International Conference on Energy Technology and Thermodynamic System (ETTS 2022). Jun. 24, 2022.
10. **Hui Pan**, Multi-metal compounds for Water Splitting, **Invited talk**, 闽澳学术论坛. May 19, 2022.
11. **Hui Pan**, Design and Fabrication of Materials for Multiple Applications – A view from “Solid State Physics”, **Invited talk**, Chongqing University, Mar. 24, 2022.
12. **Hui Pan**, Design and Fabrication of Electrocatalysts for Water Oxidization, **Keynote talk**, 2022 International Symposium on Green Energy Development Technology (GEDT 2022). Jan. 14, 2022.
13. **Hui Pan**, Design of Materials for Multi-functional Applications – A view from “Solid State Physics”, **Invited talk**, 5<sup>th</sup> Forum of Materials Genome Engineering (ForMGE), Zhengzhou, China, Dec. 15<sup>th</sup> -17<sup>th</sup>, 2021.
14. **Hui Pan**, Design of Materials for Multi-functional Applications, **Keynote talk**, 2021 5th International Conference on Sensors, Materials and Manufacturing (ICSMM 2021), 2021 5th International Conference on Advanced Manufacturing and Materials (ICAMM2021), and 2021 10th International Conference on Chemical Science and Engineering (ICCSE 2021), Nov. 19-21, 2021.
15. **Hui Pan**, Surface Reconstruction and Phase Transition of Electrocatalysts in OER, **Invited talk**, 1<sup>st</sup> International Conference on Energy Materials (ICEM) 2021, Nov. 5-8, 2021.
16. **Hui Pan**, Design of Catalysts for N<sub>2</sub>-Reduction, **Invited talk**, Materials for Humanity (MH 21), Singapore, Jul. 6~9, 2021.
17. **Hui Pan**, P/N-Functionalized MXenes for Electrocatalysis, **Keynote talk**, IUMRS-ICA2020 & MRS-Thailand, Feb. 23-26, 2021.
18. **Hui Pan**, Enhanced Anchoring of Single-atom catalysts on N-functionalized MXenes for CO<sub>2</sub> reduction, **Invited talk**, The 3<sup>rd</sup> International Conference on MXenes, Ningbo, China, Oct. 11-14, 2020.
19. **Hui Pan**, Design and Fabrication of Nanomaterials for Energy Harvesting, **Keynote talk**, The 5th International Conference on Advances in Materials, Mechatronics and Civil Engineering (ICAMMCE 2020), Suzhou, China, Mar. 20-22, 2020.
20. **Hui Pan**, Design of Multi-functional 2D Materials, **Invited talk**, International Symposium on Condensed Matter Physics, Guangdong University, Nov. 09-10, 2019.

21. **Hui Pan**, Design of 2D Materials for Energy Harvesting, **Invited talk**, 粤港澳高校联盟 2019 年青年学者分论坛——基于超算先进材料应用研究, 中山大学国家超级计算广州中心, **2019/10/31**.
22. **Hui Pan**, Design of Novel 2D Materials, **Invited talk**, the 10th International Conference of the Asian Consortium of Computational Materials Science (ACCMS-10), Hong Kong, Jul. 22-26, 2019.
23. **Hui Pan**, Design of co-catalysts for enhanced photocatalytic hydrogen production, **Invited talk**, The International Conference on Materials for Advanced Technologies (ICMAT) 2019, Singapore, Jun. 22~28, 2019.
24. **Hui Pan**, Design of 2D materials for multi-functional applications, **Invited talk**, The International Conference on Materials for Advanced Technologies (ICMAT) 2019, Singapore, Jun. 22~28, 2019.
25. **Hui Pan**, 2D Materials Design for Versatile Applications, **Invited talk**, the University of Electronic Science and Technology of China, Chengdu, China, June 14, 2019.
26. **Hui Pan**, Multifunctional applications of two-dimensional materials, **Invited talk**, Chongqing University, Chongqing, China, June 12, 2019.
27. **Hui Pan**, 2D Materials: From spintronics to catalysts, **Invited talk**, Chongqing University, Chongqing, China, June 11, 2019.
28. **Hui Pan**, Design of Pentagonal Monolayers for diverse applications, **Invited talk**, the 2<sup>nd</sup> International Conference on MXenes for Energy Applications, Beijing, China, May 10~12, 2019.
29. **Hui Pan**, Design of 2D materials for hydrogen production, **Invited Talk**, The 10<sup>th</sup> Singapore International Conference on Chemistry (SICC10), National University of Singapore, Singapore, Dec. 16-19, 2018.
30. **Hui Pan**, 2D materials as Electro-/Photo-catalysts, **Invited Talk**, The 8<sup>th</sup> Young Scholars Symposium on Nano & New Energy Technology (NNET 2018), Jinan University, Guangzhou, China, Sep. 26-29, 2018.
31. **Hui Pan**, Design of 2D monolayers as catalysts for energy harvesting, **Invited talk**, the Conference of the Asian Consortium on Computational Materials Science Theme Meeting (ACCMS-TM 2018), Ha Noi, Vietnam, Sep 6~9, 2018.
32. **Hui Pan**, Design and Fabrication of Catalysts for Water-Splitting, **Invited talk**, the 8<sup>th</sup> international conference on Advanced Functional Materials & Devices (AFMD), Catholic University of Leuven, Belgium, August 17~19, 2018.
33. **Hui Pan**, Hydrogen production from water, **Keynote talk**, the International Conference on Mechanical, Electric and Industrial Engineering (MEIE2018), Hangzhou, China, May 27~28, 2018.
34. **Hui Pan**, MXenes: Novel Catalysts for Hydrogen Production, **Invited talk**, the 1<sup>st</sup> International Conference on MXenes for Energy Applications, Changchun, China, May 25~26, 2018.
35. **Hui Pan**, Design and Fabrication of electrocatalysts for hydrogen production, **Invited Talk**, the South University of Science and Technology of China, Shenzhen on March 15-17, 2018.
36. **Hui Pan**, Materials Design for Solar-Driven Water Splitting, **Invited talk**, The 18th International Union of Materials Research Societies International Conference in Asia (IUMRS-ICA 2017), Taipei, Taiwan, Nov. 06~09, 2017.
37. **Hui Pan**, 2D Monolayers: Promising Materials for Versatile Applications, **Invited talk**, Huazhong University of Science and Technology, Wuhan, China, Aug. 03~06, 2017.
38. **Hui Pan**, Electronic, Magnetic, and Chemical Properties of 2D TMDs and MXenes, **Invited talk**, The 9th Joint Meeting of Chinese Physicists Worldwide (OCPA9), Beijing, China, Jul. 17~20, 2017.
39. **Hui Pan**, Electronic, Magnetic, and Chemical Properties of 2D Metal Nitrides and Phosphides, **Invited talk**, The International Conference on Materials for Advanced Technologies (ICMAT) 2017, Singapore, Jun. 18~23, 2017.

40. **Hui Pan**, Materials design for hydrogen production from water, **Plenary talk**, the 10<sup>th</sup> international conference on computational physics, Macao, Jan. 16~20, 2017.
41. **Hui Pan**, Multi-functional applications of 2D monolayers, **Invited Talk**, Zhejiang University of Technology, Hangzhou, on Oct. 10, 2016.
42. **Hui Pan**, Multi-functional applications of 2D monolayers, **Invited Talk**, Zhejiang University, Hangzhou, on Oct. 08, 2016.
43. **Hui Pan**, Materials design for solar energy harvesting, **Talk given**, South University of Science and Technology of China, Shenzhen on Aug. 08, 2016.
44. **Hui Pan**, Physical and Chemical Properties of Metal-dichalcogenides Monolayers, **Invited Talk**, The 2016 International Conference on Electronic Materials (ICEM2016), Jul. 4-8, 2016.
45. **Hui Pan**, Unique Electronic, Magnetic, and Chemical Properties of Metal-dichalcogenides Monolayers, **Talk given at the University of New South Wales, Sydney, Australia, on Jun. 17, 2016.**
46. **Hui Pan**, Electronic, Magnetic, and Chemical Properties of Metal-dichalcogenides Monolayers, **Talk given at the Institute of High Performance Computing, Singapore, on Feb. 12, 2016.**
47. **Hui Pan**, Waved Graphenes --- Unusual Physical and Chemical Properties, **Invited Talk, International Workshop on Functional Materials 2015 (Macau).**
48. **Hui Pan**, Unusual Mechanical, Electronic, Magnetic, and Chemical Properties of Waved Graphene. **The 4<sup>th</sup> Global Conference on Materials Science and Engineering Aug 3-6, 2015, Macau**
49. **Hui Pan**, Magnetic and Electronic Evolutions of Metal Dichalcogenide Monolayers Tuned by Hydrogenation and Strain. **The International Conference on Materials for Advanced Technologies 2015 (ICMAT2015), Singapore.**
50. **Hui Pan**, TiO<sub>2</sub>-based photocatalyst for hydrogen production: dopant and defect, **Invited Talk, 2015 EMN East Meeting (Energy Material Nanotechnology), Apr. 20-23, Beijing (China).**
51. **Hui Pan**, Electronic, Magnetic, and Catalytic properties of Transition Metal Dichalcogenide Monolayers, **Invited Talk, International Workshop on Functional Materials 2014 (Macau).**
52. **Hui Pan**, Physical and Chemical Properties of 2D Metal Dichalcogenides, **Invited Talk, 2014 UM and HKU Joint Workshop on Science and Technology Innovation, 2014 (Macau).**
53. **Hui Pan**, Design and Fabrication of TiO<sub>2</sub>-based Photocatalyst for Hydrogen Production, **Invited Talk, Workshop on Functional Ceramics, University of Macau, 2013 (Macau SAR, China)**
54. **Hui Pan**, MoS<sub>2</sub> Nanoribbons: Effects of Edge and Strain on its Magnetic and Electronic Properties, **the 12<sup>th</sup> Asia-Pacific Physics Conference of AAPPS (APPC12) 2013 (Japan).**
55. **Hui Pan**, Design of GaN-Based Photocatalyst for Hydrogen Production: ZnO-Codoped GaN Nanotubes, **the 7<sup>th</sup> International Conference on Materials for Advanced Technology (ICMAT) 2013 (Singapore).**
56. **Hui Pan**, Edge-dependent Structural, Electronic, and Magnetic Properties of MoS<sub>2</sub> Nanoribbons, **The International Union of Materials Research Society – International Conference in Asia (IUMRS-ICA) 2012 (Korea).**
57. **Hui Pan**, GaN/ZnO superlattice nanowires as photocatalyst for water-splitting: first-principles study on electronic and magnetic properties, **MRS Spring Meeting 2012 (USA).**
58. **Hui Pan**, Effects of defects and (H, N)-codoping on the photocatalytic ability of TiO<sub>2</sub>: a first-principles study, **MRS Spring Meeting 2011 (USA).**
59. **Hui Pan** and Yong-Wei Zhang, ab initio study on the photocatalytic and magnetic properties of graphitic carbon nitride nanotubes, **MRS Spring Meeting 2011 (USA).**
60. **Hui Pan**, Xiaofeng Qiu, Wenguan Zhu, Wei Wang, M. Parans Paranthaman, Gyula Eres, Zhenyu Zhang, Baohua Gu, Defect-Induced Bandgap Narrowing in TiO<sub>2</sub> and Photochemical Water Splitting in Visible Light, **MRS Fall Meeting 2008 (USA).**
61. **Hui Pan**, Yuanping Feng, Jianyi Lin, Tungsten Carbide Nanotube for Hydrogen Adsorption: First-Principles Calculation, **AsiaNano 2008 (Singapore).**

62. Yuan Ping Feng, **Hui Pan**, Jiabao Yi, Rongqin Wu, Lei Shen, Jun Ding, Jianyi Lin, Dilute Magnetic Semiconductors Without Magnetic Elements: First-Principles Prediction and Experimental Demonstration, *International Conference on Electronic Materials, IUMRS-ICEM 2008 (Australia)*.
63. **Hui Pan**, J Yi, J Y Lin, Y P Feng, J Ding, L H Van, J H Yin, Room Temperature Ferromagnetism in Carbon-Doped ZnO, *MRS Spring Meeting 2007 (USA)*.
64. **Hui Pan**, Yuanping Feng, Jianyi Lin, Magnetic Properties of OH-functionalized Carbon Nanotubes, *the 4<sup>th</sup> International Conference on Materials for Advanced Technologies (ICMAT) 2007 (Singapore)*.
65. **Hui Pan**, Rongqin Wu, Lei Shen, Jiabao Yi, Junhua Yang, Jianyi Lin, Yuan Ping Feng, Jun Ding, L H Van, J H Yin, Room Temperature Ferromagnetism in Carbon-Doped ZnO, *The 4<sup>th</sup> Conference of the Asian Consortium on Computational Materials Science 2007 (Korea)*.
66. **Hui Pan**, Jianyi Lin, Weizhe Chen, Han Sun, Yuanping Feng, Wei Ji, Optical Limiting and Hydrogen Storage Characterization of Cu, Cu<sub>2</sub>O and CuO Nanostructures, *International Congress on Nanotechnology 2005 (USA)*.
67. **Hui Pan**, Zhenhua Ni, Han Sun, Cheekoh Poh, Zhexiang Shen, Yuanping Feng, Jianyi Lin, Optical and Raman Characterization of ZnO Nanowires, *The 3<sup>rd</sup> International Conference on Materials for Advanced Technologies (ICMAT) 2005 (Singapore)*.
68. **Hui Pan**, Quanxi Cao, Liyin Tong, Micro-defect in CZ-Si Crystal: its Control and Elimination, *The 8<sup>th</sup> International Conference on Electronic Materials 2002 (China)*

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### Professional Affiliations

Member of Physical Society of Macau (PSM, Macau)  
 Member of Materials Research Society-Singapore (MRS-S)

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### Professional Services

- Member of Local Organizing Committee for the 10<sup>th</sup> Biennial International Conference of The Asian Consortium on Computational Materials Science (ACCMS-10), hosted by City University of Hong Kong for July 22 – 26, 2019.
- Member of International Advisory Committee in the 10<sup>th</sup> International Conference of Computational Physics (ICCP11). Hangzhou, China, Jun. 24-28, 2019.
- Session chair in the 10<sup>th</sup> International Conference on Materials for Advanced Technologies (ICMAT). Singapore, Jun. 23 - 28 2019.
- Session chair in the 2<sup>nd</sup> international conference on MXenes, Beijing, China, May 10-12, 2019.
- The Secretary of the 10<sup>th</sup> International Conference of Computational Physics (Macao, 2017)
- Chair of the symposium on “Computational Study on Nanosctructures” in the 10<sup>th</sup> international Conference on Computational Physics.
- Member of the Local Organizing Committee in the International Workshop on Solid-State Lighting of LED and Laser Diode, Macau 2016

### Professional Review Services

### Journals

Dr. Pan has served as a regular reviewer for more than 40 international SCI journals, such as Chemistry of Materials, ACS Nano, Physical Review B, Journal of Physical Chemistry, ACS Applied Materials &

Interface, New Journal of Physics, Journal of Power Sources, Energy & Environmental Science, and Applied Catalyst B: Environmental.