

2025 Belt and Road International Symposium on High-Temperature Solid Oxide Cells

2025“一带一路”高温固体氧化物电池研讨会

会议手册

Conference Manual

11月19日-11月22日 | Shanghai · China

中国 · 上海



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Scope of the Symposium

会议主旨

High-temperature solid oxide cell (HT-SOC) technology, encompassing both fuel cells (SOFC) and electrolyzers (SOEC), is a pivotal technology in the global transition toward a clean, secure, and sustainable energy future. It is fundamental to the hydrogen economy, carbon-neutral fuel cycles, and highefficiency power generation.

The 2025 Belt and Road International Symposium on High-Temperature Solid Oxide Cells, hosted by the Shanghai Institute of Applied Physics (SINAP), will serve as a premier platform for leading scientists, engineers, and industry experts from "Belt and Road" countries and beyond.

This symposium will provide a focused forum to address the most critical scientific questions, engineering challenges, and technological innovations in the field. The scope of the symposium bridges the gap from fundamental science to system-level application, fostering the interdisciplinary integration required for the next generation of breakthroughs.

Symposium committee, SINAP
October 2025

高温固体氧化物电池（HT-SOC）技术，包括固体氧化物燃料电池（SOFC）和电解池（SOEC），是全球向清洁、安全和可持续能源未来转型的关键技术。它是氢经济、碳中和燃料循环和高效发电的基础。

由中国科学院上海应用物理研究所（SINAP）主办的 2025 “一带一路” 高温固体氧化物电池国际研讨会，将为来自“一带一路”沿线及其他国家的顶尖科学家、工程师和行业专家提供一个一流的平台。

本届研讨会将提供一个集中的论坛，以探讨该领域最关键的科学问题、工程挑战和技术创新。会议范围旨在搭建从基础科学到系统级应用的桥梁，促进实现下一代突破所需的跨学科融合。

研讨会组委会，上海应用物理研究所
2025 年 10 月

Chair and Organizing Committee 会议召集者和组织委员会

Meeting Conveners 会议召集人



Jian-Qiang Wang

王建强研究员



Guntae Kim

金建兑研究员



Guoping Xiao

肖国萍正研级高级工程师

Hosting Institution 主办单位

Shanghai Nuclear Society
上海市核学会

Shanghai Institute of Applied Physics, CAS
中国科学院上海应用物理研究所

Chairs 主席

Jian-Qiang Wang (Shanghai Institute of Applied Physics, CAS)

王建强 (中国科学院上海应用物理研究所)

Chengxin Li (Xi'an Jiaotong University)

李成新 (西安交通大学)

Committee 委员

Guntae Kim, Guoping Xiao, Linjuan Zhang, Zhibin Yang, Lichao Jia, Kongfa Chen, Hanchen Tian, Wenlu Li, Liangdong Fan, Xiao Lin, Yihan Ling, Yuqing Wang, Chengzhi Guan, Lei Bi, Yu Chen, Xiaoliang Zhou, Donglin Han, Min Chen, Bingbing Niu...

金建兑、肖国萍、张林娟、杨志宾、贾礼超、陈孔发、田汉宸、李文路、范梁栋、林逍、凌意瀚、王雨晴、关成志、毕磊、陈宇、周晓亮、韩东麟、陈旻、牛冰冰 ...

Secretary 秘书组

Lige Zhang, Yue Geng

张礼格、耿越

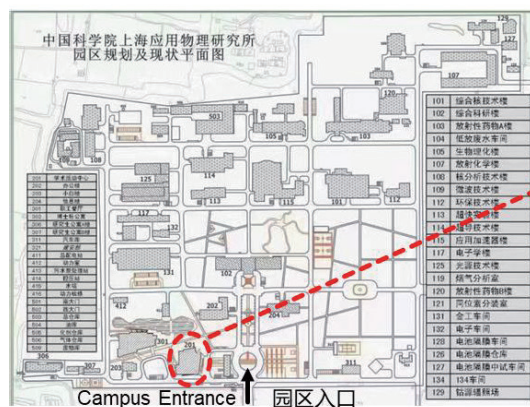
Meeting Location & Overall Agenda

会议地点与日程概览

Venue location 会议地点

Academic Exchange Center (Building 201), Shanghai Institute of Applied Physics, Chinese Academy of Science, Jialuo Road # 2019, Jiading, Shanghai, 201800, China

学术活动中心（201 楼），上海应用物理研究所，嘉罗公路 2019 号，上海市嘉定区（201800），中国



Overall Agenda 日程概览

Date/Time 日期 / 时间	09:00-12:00	12:00-13:30	13:30-17:30
11.19.2025 Wednesday (周三)			Meeting Registration 会议登记
11.20.2025 Thursday 周四	Morning session 早会	Lunch break 午休	Afternoon session 午会
11.21.2025 Friday 周五	Morning session 早会	Lunch break 午休	Afternoon session 午会

Registration and Meeting Check-In

登记与会议签到处

Venue location 会议地点

The symposium has two registration and check-in sites. Participants are welcome to check-in at either location.

会议设有两处登记与签到地点。参会专家可自行选择签到地点。

Shanghai Jiading Sheraton Hotel 上海嘉定喜来登酒店



Check-In hours: 11/19 14:00-21:00

Academic Exchange Center, SINAP 上海应用物理研究所学术活动中心



Check-In hours: 11/20-21 08:30-16:30

Please bring your ID/passport for check-in.No registration fee.

请携带身份证 / 护照办理会议登记手续。无会议注册费用。

Meeting Guidelines: Commute

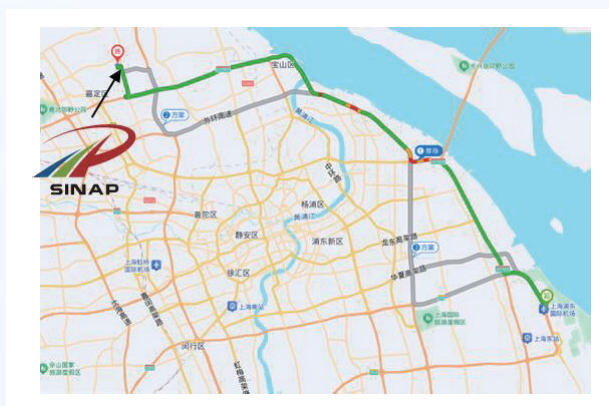
会议指引：交通信息

The following are the distances and driving times from the conference venue to major transportation hubs in Shanghai.

以下是会议地址到上海主要交通枢纽的距离和车程。

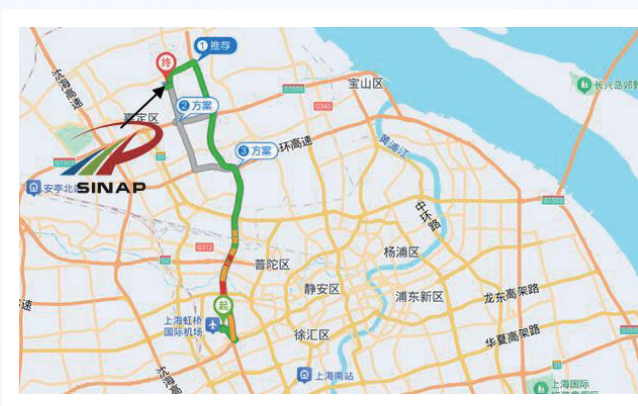
Shanghai Pudong International Airport 上海浦东国际机场

~70 km (~1 hr 30 mins Drive 约一个半小时车程)



Shanghai Hongqiao International Airport, Railway Station 上海虹桥机场、火车站

~34 km (~1 hr Drive 约一小时车程)



Shanghai Railway Station 上海火车站

~33 km (~1 hr Drive 约一小时车程)



Shanghai South Railway Station 上海南站

~45 km (~1 hr 20 mins Drive 约一小时二十分钟车程)

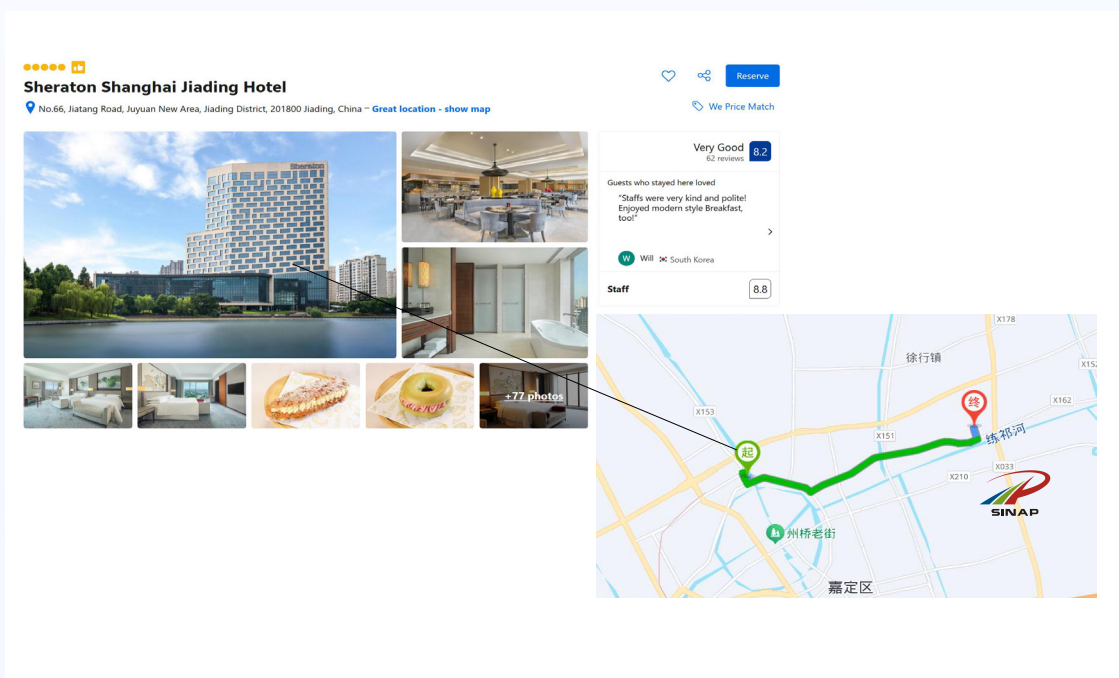


Meeting Guidelines: Recommended Accommodation

会议指引：推荐住宿地点

Shanghai Jiading Sheraton Hotel 上海嘉定喜来登酒店

~5 km (~15 min drive from the venue 距会议地址约 15 分钟车程)



Add: 66 Jiatang Hwy, Jiading District, Shanghai, 201800
地址：上海市嘉定区嘉唐公路 66 号 (201800)

Reservation & Fees 预订方式及费用

For those booking independently, please contact the hotel manager, Ms. Sunny Yan at +86-18616587217 (Conference Rebate Price: 500RMB/night). Fees related to accommodation and transportation are at your own expense.

自行预订的专家请联系酒店颜经理 (+86-18616587217)，会议协议价为 500 元 / 晚。请自理酒店住宿和交通费用。

Conference Name: 2025 Belt and Road Symposium on High-Temperature Solid Oxide Cells
报会议名称：2025“一带一路”高温固体氧化物电池研讨会

Commute 交通出行

Shuttles will be arranged for commute between the hotel and venue.
酒店和会场之间将安排接驳车。

Contact Information

会议联系人

Name 姓名	Cell phone 手机号码	Email 邮件
Guoping Xiao 肖国萍	+86-13524289659	xiaoguoping@sinap.ac.cn
Lige Zhang 张礼格	+86-13311976616	zhanglige@sinap.ac.cn
Yutian Yu 余喻天	+86-18907030701	yuyutian@sinap.ac.cn
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Detailed Meeting Agenda

详细会议议程

11.20 Morning Session 早上会议安排

Time: 09:00-13:30

09:00-09:10	Welcoming ceremony
09:10-09:40 (Keynote)	Enhancing performances of perovskite electrocatalysts for solid oxide fuel cells/solid oxide electrolysis cells Jing-Li Luo, Shenzhen University/University of Alberta
09:40-10:00 (Invited speaker)	Medium and High Entropy Oxygen Electrode Materials of Solid Oxide Cells: Strategy and Mechanism Zhe Lü, Harbin Institute of Technology
10:00-10:20 (Invited speaker)	Solid Oxide Fuel Cells: From Materials Research to Industrial Fabrication Zhipeng Li, Northwestern Polytechnical University
10:20-10:30	Coffee break & Poster session
10:30-11:00 (Keynote)	Understanding the Durability of Oxygen Electrodes in High Steam Conditions for Reversible Protonic Ceramic Electrochemical Cells Shaorong Wang, China University of Mining and Technology
11:00-11:20 (Invited speaker)	Enhancing the long-term stability of SOFCs by lowering thermal mismatch using negative thermal expansion coefficient materials Piotr Winiarz, AGH University of Krakow
11:20-11:40 (Invited speaker)	Catalytic Layered Double Perovskites for Sustainable Fuel Cells and Electrolyzers Sivaprakash Sengodan, Khalifa University
11:40-13:30	Group photo, Campus tour, Lunch break

Detailed Meeting Agenda

详细会议议程

11.20 Afternoon Session 下午会议安排

Time: 13:30-18:30

13:30-14:00 (Keynote)	Key materials for SOFC/SOEC Jian Li, Huazhong University of Science and Technology
14:00-14:30 (Keynote)	Thin Films and Surface Modifications for Solid Oxide Fuel Cells Pei-Chen Su, Nanyang Technological University
14:30-14:50 (Invited speaker)	A catalyst-coating strategy for enhancing the electrochemical stability of proton-conducting R-SOC Hanchen Tian, Xi'an Jiaotong University
14:50-15:10 (Invited speaker)	Modeling analysis and Optimal Control of Solid Oxide Electrolysis Cell System for Hydrogen Production Zhiping Xia, Jiangxi Polytechnic University
15:10-15:20	Coffee break & Poster session
15:20-15:40 (Invited speaker)	Quantifying The Mechanical Degradation of Solid Oxide Cells Based on a Unified Multiphysics Coupling Numerical Framework Zhenjun Jiao, Harbin Institute of Technology
15:40-16:00 (Invited speaker)	Study on Reaction Mechanism and Transfer Processes of Solid Oxide Cells Yuqing Wang, Beijing Institute of Technology
16:00-16:20 (Invited speaker)	Modeling and Optimization of Methane Fueled Solid Oxide Fuel Cell: From Components to System Integration Keqing Zheng, China University of Mining and Technology
16:20-16:40 (Invited Speaker)	Rational Design of Critical Materials for High-Performance and Durable Reversible Proton conducting Solid Oxide Cells Yucun Zhou, Huairou Laboratory
16:40-17:00 (Invited Speaker)	Insights and Practices on Engineering Development of SOCs at Hyenergy Tech Chengzhi Guan, Hyenergy Tech
17:00-17:30	Oral report and discussion
18:30-	Dinner banquet

Detailed Meeting Agenda

详细会议议程

11.21 Morning Session 早上会议安排

Time: 09:00-13:30

09:00-09:30 (Keynote)	Assessment of Protonic Ceramic Electrolyte and Electrode Materials from View Point of Cr Poisoning San Ping Jiang, Curtin University/Foshan Xianhu Laboratory
09:30-10:00 (Keynote)	Grain-boundary engineering to boost the oxygen electrode reaction kinetics of SOCs Hailei Zhao, University of Science and Technology Beijing
10:00-10:20 (Invited speaker)	SOFC for H ₂ gas sensors: its scientific foundations, IP & commercialization Jung-Sik Kim, Beihang University
10:20-10:40 (Invited speaker)	From Lab to Pilot: Scalable Gel-Casting of Functional Oxides for Solid Oxide Cells and Catalytic Hydrogen Systems Lan Zhang, 1 Energy Research Institute @NTU, Nanyang Technological University 2 China-Singapore International Joint Research Institute (CSIJRI)
10:40-10:50	Coffee break & Poster session
10:50-11:20 (Keynote)	SOFC past, today and tomorrow and Belt - Road initiatives Bin Zhu, Loughborough University
11:20-11:40 (Invited speaker)	Development and Production of Solid Oxide Cells based on Multipotent Zirconia Byung-Ho Yoon, Dentium Co. Ltd.
11:40-12:00 (Invited speaker)	The design of PCHE or FPCH for SOFC Shenghui Liu, Shaanxi Zhituo Solid State Additive Manufacturing Co., Ltd.
12:00-13:30	Lunch break

Detailed Meeting Agenda

详细会议议程

11.21 Afternoon Session 下午会议安排

Time: 13:30-17:40

13:30-14:00 (Keynote)	Hydrogen from natural gas, biogas, and ammonia using proton ceramic electrochemical reactors Truls Norby, University of Oslo
14:00-14:30 (Keynote)	Progress and Challenge of High Temperature Electrolysis by Molten Salt Reactor Jian-Qiang Wang, Shanghai Institute of Applied Physics
14:30-14:50 (Invited speaker)	The industrial scale manufacturing of SOC products in Elcogen's ELCO I, and the roadmap to large scale SOC deployment Siu Fai Au, ELCOGEN
14:50-15:10 (Invited speaker)	Sinopec's SOC Technology for Green Hydrogen Production Yan Yang, Sinopec Dalian Research Institute of Petroleum and Petrochemicals
15:10-15:20	Coffee break & Poster session
15:20-15:40 (Invited speaker)	Direct assembly approach for solid oxide cells: Constructing efficient and durable nanocomposite fuel electrodes Kongfa Chen, Fuzhou University
15:40-16:00 (Invited speaker)	Energy Management Strategies and System Integration for High-Efficiency Power-to-Fuel Systems Chen Zhang, Shanghai Jiao Tong University
16:00-16:20 (Invited speaker)	Effective surficial proton transport through surface vacancy engineering of SrTiO_{3-6} Sajid Rauf, Shenzhen University
16:20-16:35 (Oral Report)	Hermetic sealing with low-melting zinc-rich glass modified by Ni-Co spinel additive for planar solid oxide fuel cell (SOFC) stack system Fazal E Haq, University of Science and Technology of China
16:35-16:50 (Oral Report)	Exsolution-Driven Surface Engineering of Ruddlesden-Popper Oxides for Protonic Ceramic Fuel Cell Cathodes Zohaib Ur Rehman, University of Science and Technology of China
16:50-17:05 (Oral Report)	Highly Active Nanoexsolved BaO-Decorated $\text{Nd}_{0.2}\text{Sr}_{0.4}\text{Ba}_{0.4-\delta}\text{Fe}_{0.2}\text{Co}_{0.7}\text{Mn}_{0.1}\text{O}_{3-6}$ High-Entropy Oxide Electrocatalyst for Oxygen Reduction Reaction Zaheer Ud Din Babar, Xi'an Jiaotong University
17:05-17:15	Closing remarks, Tour to Hyenergy Tech

Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Jing-Li Luo

Shenzhen University
University of Alberta

Prof. Jing-Li Luo is a Fellow of the Canadian Academy of Engineering and a Foreign Fellow of the Chinese Society for Corrosion and Protection. She is Professor Emeritus in the Department of Chemical and Materials Engineering at the University of Alberta, Canada, and held a Canada Research Chair in Alternative Fuel Cells (2004–2015). She is a Council Member of the International Corrosion Council. Dr. Luo has carried out extensive research on solid oxide fuel cells and solid oxide electrolysis cells, energy storage and conversion systems, and corrosion and protection. She has published more than 500 peer-reviewed papers in leading journals such as Journal of the American Chemical Society, Nature Communications, Science Advances, Angewandte Chemie International Edition, Advanced Materials, Matter and Chem. She has been ranked among the World's Top 2% Scientists (Lifetime Scientific Influence Ranking) for multiple years.

Presentation Title: Enhancing performances of perovskite electrocatalysts for solid oxide fuel cells/solid oxide electrolysis cells.

Abstract: Perovskite oxides exhibit excellent ionic and electronic conductivity, as well as good redox properties. Therefore, they have become very attractive as electrode materials for solid oxide fuel cells/solid oxide electrolysis cells (SOFCs/SOECs). However, they generally show poor catalytic activity compared with metal-based catalysts. Although they have stable structure, their stability is problem at high applied potential in SOEC mode. To address these problems, we proposed several promising methods. This presentation mainly introduces the progress and applications of these strategies to enhance the reaction kinetics and improve the stability of perovskite electrocatalysts for SOFC/SOEC.

* Arranged in order of the meeting agenda * 专家按会议议程表顺序排列

Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Shaorong Wang

China University of Mining
and Technology

Prof. Shaorong Wang is currently full professor at the School of Chemical Engineering & Technology in China University of Mining and Technology, Xuzhou, China. He received his B.S. degree and M.S. degree in Physical Chemistry at Chengdu University of Science & Technology in 1983 and 1986, respectively. He received his Ph.D. degree in Material Engineering at Yokohama National University, Yokohama, Japan in 1998. He has been worked in Shanghai Institute of Ceramics, Chinese Academy of Sciences for over ten years. His research interest focuses on the materials, single cell, stack, and systems of solid oxide cell and solid electrolysis cell. He has published 3 books and over 160 papers.

Presentation Title: Understanding the Durability of Oxygen Electrodes in High Steam Conditions for Reversible Protonic Ceramic Electrochemical Cells.

Abstract: Reversible protonic ceramic electrochemical cells (R-PCECs) are considered as the highly promising contraptions for bidirectional electric energy generation or storage, capable of efficiently converting electrical and chemical energy in mutual directions. However, the sluggish electrocatalytic activity at low temperature and unsatisfactory operational durability of oxygen electrodes remains the primary challenges to the commercial application of R-PCECs. Here, the degradation mechanism of the $\text{BaFe}_{0.4}\text{Co}_{0.4}\text{Zr}_{0.1}\text{Y}_{0.1}\text{O}_{3-5}$ (BFCZY) oxygen electrode under humid conditions is systematically investigated via the three-electrode method. The degradation can be ascribed to the formation of BaCO_3 caused by the water-facilitated Ba segregation. The activity and stability of the BFCZY oxygen electrode are significantly improved through heterointerface engineering by infiltrating the BaCoO_3 (BCO) catalyst. At 600 °C in 30 vol% H_2O -air, the heterointerface engineering decreases the polarization resistance of the BFCZY electrode by half (from 0.42 to 0.21 $\Omega \text{ cm}^2$) and the decay rate by more than one order of magnitude (from 0.384 to 0.026 $\Omega \text{ cm}^2/100 \text{ h}$) (Figure 1). Meanwhile, a R-PCEC with the BCO-BFCZY oxygen electrode exhibits high activity and stability in both the fuel cell and water electrolysis modes. The substantially increased electrocatalytic activity and stability of the oxygen electrode is primarily ascribed to the improved surface oxygen exchange process and inhibited Ba segregation. In addition, the stability under the Cr atmosphere are systematically investigated.

* Arranged in order of the meeting agenda * 专家按会议议程表顺序排列

Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Jian Li

Huazhong University of Science
and Technology

Prof. Jian Li is a Distinguished Professor and "Huazhong Scholar" at Huazhong University of Science and Technology (HUST). He holds dual PhDs in Ceramic Engineering from the University of Illinois at Urbana-Champaign (USA) and in Metallic Materials from China's Central Iron and Steel Research Institute. Before joining HUST, Professor Li gained invaluable industry experience as a Senior Materials Engineer at FuelCell Energy, Inc. (USA) and a Senior Scientist at Global Thermoelectric, Inc. (Canada). Upon his return to China, he established the Fuel Cell Research Center at HUST and has since become a national pioneer in the field. His team developed China's first SOFC independent power system in 2010 and later, the nation's first 5kW SOFC system in 2015, both milestone achievements. His research covers the entire SOFC technology chain, from materials to system integration. He has led over 60 R&D projects, including key National "863" and "973" programs, securing over 70 million RMB in funding. A prolific author, he has published over 200 SCI papers and holds numerous US and Chinese patents.

Presentation Title: Key materials for SOFC/SOEC.

Abstract: This presentation reviews the requirements and current status of the key materials for SOFC/SOEC, including the electrode and electrolyte materials of the single cell, the sealing and interconnect materials used in the stack, and the materials for the combustor, heat exchanger, and fuel reformer in the balance-of-plant.

* Arranged in order of the meeting agenda * 专家按会议议程表顺序排列

Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Pei-Chen Su

Nanyang Technological University

Prof. Pei-Chen Su is an Associate Professor with tenure at the School of Mechanical and Aerospace Engineering, Nanyang Technological University (NTU), Singapore. She earned her Ph.D. in Mechanical Engineering with a minor in Electrical Engineering from Stanford University in 2009. Currently, she serves as the Assistant Chair – Academic and Cluster Director at the Energy Research Institute @ NTU (ERI@N), and Vice President of the Thin Films Society. Her research focuses on micro/nano system technologies and nanoscale thin film materials engineering, particularly at the interface of energy conversion devices such as solid oxide fuel cells (SOFCs) and electrolysis cells. Professor Su has made significant contributions to the development of high-power density nano-thin film SOFCs and sustainable manufacturing processes. Currently her work aligns with Singapore's national hydrogen roadmap, emphasizing advancements in ammonia SOFCs for maritime decarbonization. Her team also work on 4D Printing material development and device innovation, aiming for commercialization of wearable and surgical medical devices.

Presentation Title: Thin Films and Surface Modifications for Solid Oxide Fuel Cells.

Abstract: The efficiency and long-term stability of solid oxide fuel cells are significantly influenced by the stability and activity of their electrode materials, particularly those based on perovskites. We employed methods such as atomic layer deposition and solution infiltration to create highly defective surface layers, addressing issues like cation segregation and electrode surface degradation that affect fuel cell performance stabilities. Our findings demonstrate that these modifications substantially improve the oxygen reduction and evolution reactions, reduce polarization resistance, and suppress surface cation segregation. The underlying mechanisms, including the role of oxygen vacancies and interfacial engineering, will be discussed. By advancing surface modification technologies, we aim to develop more efficient and durable SOCs, which are crucial for sustainable energy conversion and storage applications. This research underscores the potential of chemical engineering innovations in addressing the challenges of modern fuel cell systems.

* Arranged in order of the meeting agenda * 专家按会议议程表顺序排列

Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. San Ping Jiang

Curtin University
Foshan Xianhu Laboratory

Prof. San Ping Jiang is a John Curtin Distinguished Emeritus Professor at Curtin University, Australia. He holds a BEng from the South China University of Technology and a PhD from The City University, London. Before joining Curtin in 2010, he held significant research roles at CSIRO in Australia and Nanyang Technological University in Singapore. A pioneer in bridging academia and industry, Dr. Jiang co-founded Ceramic Fuel Cells Ltd (CFCL) in Melbourne, a key player in developing high-temperature solid oxide fuel cell (SOFC) technologies. Dr. Jiang's research encompasses a wide range of energy technologies, including solid oxide and protonic ceramic fuel cells, green hydrogen and ammonia synthesis, and electrocatalysis. He is a highly influential author with approximately 550 journal publications, which have amassed over 32,500 citations and an h-index of 92. His profound impact on the field is highlighted by his repeated recognition as a Highly Cited Researcher by Clarivate in 2018, 2023, and 2024. In 2021, he co-authored the textbook "Introduction to Fuel Cells," further cementing his legacy as a leading authority in energy science.

Presentation Title: Assessment of Protonic Ceramic Electrolyte and Electrode Materials from View Point of Cr Poisoning.

Abstract: Due to the low activation energy and high mobility of proton transfer, proton ceramic cells (PCCs) including protonic ceramic fuel cells and electrolysis cells (PCFCs & PCECs) working at relatively low temperatures (673K-973K) gain an increasing attention. By decreasing the operation temperature, both the materials' choice and operation stability of PCCs will be enhanced. However, similar to high temperature solid oxide cells (SOCs), the material performance and degradation is also closely related to the surface segregation. In PCCs, Ba is one of the essential elements in both protonic conducting electrolytes and electrodes. In this work, we employed Cr poisoning as a tool to assess the Ba segregation properties of typical protonic conducting electrolyte and electrode materials, $\text{BaZr}_{0.1}\text{Ce}_{0.7}\text{Y}_{0.1}\text{Yb}_{0.1}\text{O}_{3-\delta}$ (BZCYYb) and $\text{BaCo}_{0.8}(\text{Zr}_{0.8}\text{Y}_{0.2})_{0.2}\text{O}_{3-\delta}$ (BCZY). The results show that gaseous Cr species from Fe-Cr metallic interconnect react with BZCYYb and BCZY at temperatures as low as 400-500 oC. Ba from Ba-based protonic ceramic materials segregates and reacts with Cr species, forming BaCrO_4 , leading to the significant reduction in the performance of the electrolyte and electrode materials. The assessment of protonic ceramic materials from the view point of Cr deposition and poisoning is discussed.

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Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Hailei Zhao

University of Science and
Technology Beijing

Prof. Hailei Zhao is a professor in Material Science and Engineering at University of Science and Technology Beijing (USTB). She received her Ph. D. in Physical Chemistry from USTB in March 1993. Her current research interests include materials for solid oxide cells, lithium (sodium) ion batteries, liquid metal batteries and mixed conductor gas separation membranes. She is a co-holder of 77 patents and has authored more than 320 peer reviewed publications with H-index 58. She was the Most Cited Chinese Researchers in Material Science field (Elsevier published), the recipient for New Century Excellent Talents in University, China. She is a Panel Member of Solid State Ionic Society of Chinese Ceramic Society, and the Vice-director of Beijing Ceramic Society, China. She serves on the editorial board of several academic journals.

Presentation Title: Grain-boundary engineering to boost the oxygen electrode reaction kinetics of SOCs.

Abstract: The oxygen electrode is one of the key components that determine the electrochemical performance of solid oxide cells. High active oxygen electrodes usually show high thermal expansion coefficient and poor chemical stability, which deteriorate the structure stability of cell upon change in operation condition. The heterogenous interface between different phases is rich in defects and exists usually serious lattice distortion, which provide extra energies for gas adsorption/disassociation, charge transfer and ion diffusion, contributing to enhanced electrode reaction activities. Meanwhile, the heterogenous interface can restrict the thermal expansion of two phases. We prepared several composite materials with different kinds of heterogenous interface for oxygen electrodes to enhance the oxygen reduction/evolution reaction kinetics and improve the stability, including perovskite/fluorite, and A-site double perovskite/B-site double perovskite composites. The composite oxygen electrodes tend to form coherent interface structure, which, with slight lattice mismatch, facilitates the oxygen ion transport and charge transfer kinetics, reduces the chemical expansion, and confers enhanced ORR/OER catalytic activity and structure stability.

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Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Bin Zhu

Loughborough University

Prof. Bin Zhu is a Chair Professor at Southeast University and a leading international authority on fuel cell technology. He received his Ph.D. from Chalmers University of Technology, Sweden, and held prominent academic positions at KTH Royal Institute of Technology for many years. He is renowned for pioneering the groundbreaking field of Semiconductor-Ionics, which uniquely integrates semiconductor physics with solid-state electrochemistry. This innovative approach has revolutionized the development of low-temperature (300-600°C) Solid Oxide Fuel Cells (SOFCs), leading to novel device concepts such as electrolyte-free (EFFC) and single-layer fuel cells (SLFCs). His work bridges fundamental science with practical applications for advanced energy conversion and storage. His contributions have been recognized with the WSSET Innovation Award for Power Generation, and he has been continuously named a Most Cited Scholar in China's energy sector by Elsevier since 2014. He also serves as a guest editor for the International Journal of Hydrogen Energy.

Presentation Title: SOFC past, today and tomorrow and Belt - Road initiatives

Abstract: Over the past four decades, Solid Oxide Fuel Cells (SOFCs) have evolved from high-temperature electrochemical systems operating at 1000 °C to highly engineered, multifunctional energy conversion devices capable of stable performance below 500 °C. In this keynote, I will reflect on the historical trajectory and future directions of SOFC technology—spanning from classical YSZ and doped-ceria electrolytes to emerging proton ceramics, semiconductor-ionic, and composite systems.

Drawing upon more than 36 years of research in this field, I will revisit the fundamental breakthroughs that reshaped SOFC science: the transition from purely oxygen-ion conducting zirconia systems to H⁺, hybrid H⁺/O²⁻ and electron-ion coupled conducting electrolytes; and the conceptual emergence of Semiconductor Ionics, which bridges solid-state physics and electrochemistry to unlock new paradigms of ion transport and catalytic coupling.

By integrating insights from defect chemistry, interfacial redox mechanisms, and photo-proton, proton-electron coupling phenomena, this presentation will highlight how unconventional material architectures—amorphous–nanocrystalline, hetero structured, and entropy-stabilized systems—are redefining SOFC materials and operation principles. Looking forward, the next generation of SOFCs will no longer be defined solely by temperature or electrolyte type but by functionality: adaptive, low-cost, and sustainable energy converters that unify fuel cells, electrolysis, and photochemical processes within a single platform.

Finally, some of our Belt and Road initiatives will be briefly introduced.

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Guest speaker

报告嘉宾

Keynote speakers 特邀主题演讲专家



Prof. Truls Norby

University of Oslo

Prof. Truls Norby is a professor from University of Oslo (UiO). He earns his Ph.D. 1986, and became professor at Department of Chemistry UiO 1994 and since 1997 headed Group for Electrochemistry until retirement as emeritus in 2025. He works with defects and transport in materials for solid-state fuel cells, electrolyzers, batteries, membranes, and sensors, specializing in protons and protonic transport in oxides and on their surfaces. He also integrates materials chemistry and semiconductor physics in photoelectrochemistry and oxide thermoelectric. Norby has published more than 300 journal papers and graduated more than 100 Master- and PhD-students. He has served as President for the International Society for Solid-State Ionics 2019-22 and is member of the Norwegian Academy of Science and Letters and three other national academies. He has founded three companies and won the UiO Innovation Prize 2012 and the Norwegian Guldberg-Waage medal for chemistry 2018.

Presentation Title: Hydrogen from natural gas, biogas, and ammonia using proton ceramic electrochemical reactors.

Abstract: Proton ceramic electrochemical reactors (PCERs) with BaZrO₃-based electrolytes and Ni-based positive and negative electrodes can extract dry, pure, compressed H₂ in a single step. The endothermic reaction of steam reforming or cracking is locally balanced by the electrochemical loss enabling thermoneutral operation even at high current densities. CoorsTek Membrane Sciences AS – once a spinoff from University of Oslo and now a subsidiary of CoorsTek Inc. (Co, USA) – have developed scalable tubular stacks of such PCERs to pilot-scale production. This forms basis for ongoing projects for demonstration of production of green or blue hydrogen from e.g. ammonia and biowaste.

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Guest speaker

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Keynote speakers 特邀主题演讲专家



Prof. Jian-Qiang Wang

Shanghai Institute
of Applied Physics

Prof. Jian-Qiang Wang is a distinguished researcher and doctoral supervisor at the Shanghai Institute of Applied Physics (SINAP), Chinese Academy of Sciences. He serves in multiple key leadership roles, including Director of the Center for Comprehensive Nuclear Energy Utilization and Director of the CAS Key Laboratory of Interfacial Physics and Technology. Professor Wang's research is strategically aligned with China's "dual carbon" goals, focusing on advanced nuclear energy, hydrogen production, and high-temperature Solid Oxide Electrolysis Cells (SOECs). His team achieved a significant national milestone by successfully developing and passing acceptance for China's first 200kW SOEC demonstration system. A highly accomplished leader, he has led over 20 major national and municipal projects. He has published more than 100 SCI papers and holds 96 patents (with 57 authorized). His contributions have earned him numerous honors, including the "Excellent Communist Party Member" award from the Chinese Academy of Sciences and the prestigious Shanghai Rising-Star Scholar title.

Presentation Title: Progress and Challenge of High Temperature Electrolysis by Molten Salt Reactor.

Abstract: The global transition from fossil-fuel-based economies necessitates the urgent development of reliable, high-capacity, carbon-free energy solutions. While traditional Pressurized Water Reactors (PWRs) have contributed to this goal, advanced Generation IV designs like the Thorium Molten Salt Reactor (TMSR) offer transformative advantages. From a safety perspective, TMSRs operate at low pressure with inherent passive safety features, mitigating risks associated with conventional reactors. From an efficiency standpoint, their ability to deliver high-grade process heat (600-1000°C) dramatically increases thermodynamic power efficiency. This high-temperature output is uniquely suited for nuclear hydrogen production via Solid Oxide Electrolysis Cells (SOECs), a process that boasts exceptionally high efficiency and low power consumption compared to low-temperature methods. This paper explores the crucial progress and challenges associated with the direct coupling of TMSRs and SOECs. Significant progress has been made, exemplified by the successful construction of the 2MWt TMSR at the Shanghai Institute of Applied Physics (SINAP), which validates the heat source. However, formidable challenges in dynamic load-following, materials durability, and system integration must be addressed to realize the full potential of this promising hybrid energy system for a clean energy future.

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Prof. Zhe Lü

Harbin Institute of Technology

Prof. Zhe Lü got his PhD degree in the Department of Physics, Jilin University in 1999 and conducted his postdoctoral research at the Postdoctoral Research Station of Environmental Science and Engineering, Harbin Institute of Technology. He engaged in the research of solid oxide fuel cells as well as other new energy materials physics and technology for a long time, having led and completed several scientific research projects, including those under the 863 Program and the National Natural Science Foundation. He has published over 300 academic papers in journals such as Adv. Mater. and Adv. Func. Mater., J. Power Sources, with over 5,000 citations. He holds more than 40 invention patents. He has received one first prize and one second prize in the Natural Science Award of Heilongjiang Province. He serves as a council member of the Solid-State Ionics Branch of the China Ceramic Society, a member of the Fuel Cell Professional Committee of the China Energy Research Society, and a member of the High-Temperature Fuel Cell Standards Committee. He was also a member of the Popular Science Committee of the 11th and 12th sessions of the Chinese Physical Society.

Presentation title: Medium and High Entropy Oxygen Electrode Materials of Solid Oxide Cells: Strategy and Mechanism

Abstract: Solid oxide cells (SOCs) as a promising new energy device, can operate in both fuel cell and electrolytic cell modes, enabling highly efficient conversion between chemical and electrical energy. Recent studies demonstrate that doping with various metal elements can significantly enhance the configuration entropy of oxide electrode materials, thereby improving their performance and stability. This presentation reports research achievements by the SOC research team at HIT's School of Physics on medium-to-high entropy oxygen electrode materials. The key results include: 1) $\text{La}_{0.6}\text{Sr}_{0.4}\text{Fe}_{0.8}\text{Co}_{0.2}\text{O}_{3-\delta}$ oxygen electrodes modified with high-entropy-doped cerium oxide (HEDC); 2) synthesis of single-phase high-entropy oxides ($\text{La, Pr, Nd, Sm, Gd}$) $\text{BaFe}_2\text{O}_{5+\delta}$ through A-site rare earth doping and (La, Pr, Nd, Sm) $\text{Ba}_{0.5}\text{Sr}_{0.5}\text{Co}_{1.5}\text{Fe}_{0.5}\text{O}_{5+\delta}$ with rare earth layer entropy enhancement for improving electrochemical activity and Cr poisoning resistance in SOFC oxygen electrodes as well as the suppression mechanism of entropy increase in rare earth layers on Sr segregation by theoretical simulations.

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Prof. Zhipeng Li

Northwestern Polytechnical
University

Prof. Zhipeng Li, Professor of Northwestern Polytechnical University and doctoral supervisor, is a nationally leading talent. He graduated with a Bachelor's degree in Physics from Beijing Normal University and obtained his PhD in Materials Science and Engineering from the National University of Singapore. Having spent nearly two decades studying and working abroad, he served as a Research Fellow at the Institute of Materials Research and Engineering (IMRE, A*STAR) in Singapore, the National Institute for Materials Science (NIMS) in Japan, and the National Institute of Standards and Technology (NIST) in the United States. During this period, he received the Australian National Scholarship and conducted multiple research visits at The University of Queensland (UQ). He was appointed as a Visiting Scientist at Tokyo Institute of Technology (TIT). Subsequently, he engaged in high-end industrial manufacturing within Silicon Valley's leading industrial sector, serving as Chief Engineer and Project Lead for Fortune 500 companies. Possessing comprehensive end-to-end experience spanning academia and industry, he has mastered cutting-edge core technologies in new energy fuel cells and industrial manufacturing, particularly frontline industrial production techniques. Primary research domains include: hydrogen energy and fuel cells; novel nanoceramic materials and devices; photo/electrocatalytic seawater splitting; energy storage batteries; computational simulation; machine learning; artificial intelligence; sensing and monitoring systems and software for unmanned energy installations; and novel high-efficiency energy management systems.

In the academic sphere, he has published over 80 professional papers in internationally renowned journals, contributed to more than 10 specialist compendiums and industry review articles, delivered over 30 invited keynote presentations at premier international conferences, and seen multiple research achievements featured in websites, magazines, and periodicals. Within the industrial domain, he holds over 50 granted patents both internationally and domestically.

Presentation Title: Solid Oxide Fuel Cells: From Materials Research to Industrial Fabrication.

Abstract: Solid oxide fuel cells (SOFCs) can directly convert the chemical energy stored in fuels into electrical energy, achieving power generation efficiencies of 50-60% (LHV). Combined cycle systems can attain efficiencies as high as 60-70%. SOFCs can utilise a diverse range of fuels including low-purity hydrogen, natural gas, coal gas, biogas, propane, methanol, ethanol, and diesel for power generation, effectively addressing fuel purity and transportation challenges at the supply end. In the United States and Japan, SOFCs have seen widespread application in unmanned aerial vehicles, autonomous vehicles, submarines, portable power sources, domestic combined heat and power systems, and data centre power supply. China possesses years of accumulated research in SOFC materials and components, yet lags significantly in practical application and industrialisation. There is an urgent need to increase investment in the large-scale production of SOFC single cells and in the R&D of stack and system technologies. This will enable the development of proprietary SOFC products and advance the practical implementation of SOFC technology within China. This lecture provides an overview of fuel cell materials, fabrication processes, and industrial development. It analyses critical technical challenges in transitioning from laboratory-scale production to industrial manufacturing, explores the application of advanced industrial manufacturing techniques within the SOFC sector, and offers technical support for SOFC industrialisation.

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Prof. Sivaprakash Sengodan

Khalifa University

Prof. Sivaprakash Sengodan has over 10 years of experience in the development of electrode electrolyte materials for energy conversion and storage applications, particularly solid oxide fuel cells and metal air batteries. His research is focused on understanding key ionic and electronic transport processes in electrochemical devices. Dr. Sivaprakash Sengodan particularly interested in the fundamental principles underlying the operation of fuel cells and batteries, as well as the practical aspects of their design and performance optimization. Dr. Sivaprakash Sengodan's approach to research is interdisciplinary, drawing on principles from materials science, chemistry, and engineering.

Presentation title: Catalytic Layered Double Perovskites for Sustainable Fuel Cells and Electrolyzers.

Abstract: The energy transition to sustainable energy systems requires advanced catalysts for fuel cells and electrolyzers that provide enhanced efficiency and durability. Layered double perovskites have arisen as a promising category of oxide materials to fulfill this requirement, integrating outstanding electrocatalytic activity with substantial thermal and chemical stability under operational conditions. Layered double perovskite oxides possess a tunable perovskite structure that accommodates various substitutions, enhancing their catalytic and electro catalytic properties by extensive elemental doping at both on the A and B of the perovskite lattice. Structural flexibility of layered perovskite oxides enables researchers to improve the layered perovskite materials electronic properties and defect chemical properties for improved performance, while employing earth-abundant elements as a cost-effective, sustainable replacement for noble metal catalyst.

Recently researchers have realized significant improvement in fuel cell performance through significant doping in the of perovskite compositions. A B-site doping in a layered double perovskite electrode material shows a significantly enhanced oxygen reduction reaction kinetics, fuel oxidation, redox stability and long-term stability, resulting in superior power output and substantially reduced degradation rates compared to a conventional electrode material. Simultaneously, layered double perovskites demonstrate exceptional efficacy in water electrolysis: as noble-metal-free catalysts for oxygen evolution, they facilitate efficient water splitting with minimal overpotentials and prolonged operation, thus promoting the clean generation of hydrogen fuel. Layered perovskite oxides have exhibited exceptional performance in advanced reversible fuel cell–electrolyzer systems, where double perovskite electrodes enable both electricity generation and hydrogen production in a single device. By improving energy-conversion efficiency and device durability-and aligning with circular energy pathways-layered double perovskites are promising electrode materials for next-generation, sustainable energy technologies. In this talk, I will discuss our recent developments in doped-layered perovskite oxides ($\text{PrBaTm}_{2-x}\text{R}_x\text{O}_{5+\delta}$ Tm= Co, Mn, R= Ru, Pd, Fe, Ni) for solid oxide fuel cells (SOFCs), protonic ceramic fuel cells (PCFCs), and anion-exchange membrane (AEM) electrolyzers, highlighting materials-design strategies, performance gains, and durability enhancements.

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Prof. Piotr Winiarz

AGH University of Krakow

Prof. Piotr Winiarz is an Assistant Professor at the AGH University of Krakow, Poland, specializing in advanced materials for Solid Oxide Fuel Cells (SOFCs). His research focuses on solving critical challenges in SOFC technology, from synthesis to electrochemical performance. Currently, he is investigating novel perovskite cathode materials, such as $\text{Ln}_{1-x}\text{Zn}_x\text{MnO}_{3-\delta}$, that exhibit negative thermal expansion coefficients. This innovative approach aims to reduce thermal mismatch between cell components, a key factor limiting the long-term stability and commercial viability of SOFCs. This work builds on his doctoral research, which centered on proton-conducting electrolyte materials. Since earning his PhD with honors in 2019, Dr. Winiarz has served as a Principal Investigator on three scientific projects funded by the Polish National Science Centre. An accomplished educator recognized with a Rector's prize for outstanding teaching, he actively supervises PhD students. He has published 31 articles in high-impact international journals and fosters global partnerships, including a close collaboration with the China University of Mining and Technology.

Presentation title: Enhancing the long-term stability of SOFCs by lowering thermal mismatch using negative thermal expansion coefficient materials.

Abstract: Thermal mismatch is one of the major drawbacks limiting the commercial usage of SOFCs. Upon heating, unwanted additional interfacial strain occurs between the electrolyte and the cathode (air electrode), which leads to cracks and damages the device. The novel idea is to use negative thermal expansion coefficient materials (NTEs) to adjust the thermal expansion coefficient (TEC) of the cathode, and diminish or at least minimize the thermal mismatch. In this work, several perovskite-based NTEs were synthesized, optimized, and investigated: $\text{RE}_{1-x}\text{A}_x\text{MnO}_{3-\delta}$, where $\text{RE} = \text{La}, \text{Pr}, \text{Nd}, \text{Sm}, \text{Gd}, \text{Er}, \text{Yb}, \text{Y}$; $\text{A} = \text{Zn}, \text{Cu}, \text{Ni}, \text{Co}, \text{Fe}, \text{Cr}, \text{V}, \text{Ti}$; $x \leq 0.15$. Importantly, for the first time, the origin of negative expansion was investigated in detail and explained by Raman spectroscopy as a function of temperature. It was revealed that the coexistence of certain vibration modes at elevated temperatures lowers each other's energy, effectively decreasing the unit cell volume. The best chosen material was used as an additive to an already prepared double perovskite cathode with a good set of electrochemical properties: $\text{SmBa}_{0.5}\text{Sr}_{0.5}\text{CoCuO}_{5+\delta}$. For further improvements, the composite cathode was prepared by the electrospinning (ES) method to obtain the material in the form of nanofibers with an increased specific surface area. In the case of ES $\text{SmBa}_{0.5}\text{Sr}_{0.5}\text{CoCuO}_{5+\delta} + 10\text{wt.}\% \text{Sm}_{0.85}\text{Zn}_{0.15}\text{MnO}_{3-\delta}$, at 900°C , the polarization resistance (R_p) was lower by around 60% when compared to the pristine cathode. The maximum achieved peak power density was $850\text{mW}/\text{cm}^2$ at 800°C . Very good long-term stability was recorded with only a small, negligible increase in R_p after 5 days of operation.

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Guest speaker

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Prof. Hanchen Tian

Xi'an Jiaotong University

Prof. Hanchen Tian, National-level Young Talent, is currently a Professor at Xi'an Jiaotong University and Director of the Xi'an International Joint R&D Center for Advanced Functional Coatings Technology. He received his Ph.D. in Engineering from West Virginia University in Prof. Xingbo Liu's group. Dr. Hanchen Tian focuses on advanced solid-oxide fuel and electrolysis cells, with particular expertise in electrode-material synthesis, atomic-scale structure characterization, and electrochemical analysis. Over the past five years he has published 17 peer-reviewed papers in journals including Nature Energy, J. Energy Chem and Int. Mater. Rev.

Presentation Title: A catalyst-coating strategy for enhancing the electrochemical stability of proton-conducting R-SOC.

Abstract: Protonic ceramic electrochemical cells (PCECs) have potential as long-duration energy storage systems. However, their operational stability is limited under industrially relevant conditions due to the intrinsic chemical instability of doped barium cerate-based electrolytes and oxygen electrodes against H₂O, as well as the poor electrode-electrolyte interfacial contact. Here we present a conformally coated scaffold (CCS) design to comprehensively address these issues. A porous proton-conducting scaffold is constructed and conformally coated with electrocatalyst, which has high chemical stability against H₂O, triple conductivity and hydration capability, and protects vulnerable electrolytes from H₂O. The CCS structure consolidates the electrode-electrolyte interfacial bonding to enable fast proton transfer in the percolated network. This design enables PCECs to reach electrolysis stability for 5,000 h at -1.5 A cm^{-2} and 600 °C in 40% H₂O. This work provides a general strategy to stabilize PCECs and offers guidance for designing resilient and stable solid-state energy storage systems.

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Prof. Zhiping Xia

Jiangxi Polytechnic University

Prof. Zhiping Xia is an Associate Professor with a Ph.D. in Engineering and is recognized as a High-level Talent in Jiangxi Province. He leads the Jiangxi Provincial Department of Education Key Laboratory for Intelligent Manufacturing and Control of Hydrogen Energy Equipment. He earned his Ph.D. from Huazhong University of Science and Technology in 2024 and was promoted to Associate Professor in 2023. Dr. Xia has long been engaged in research in hydrogen energy and fuel cell system control, as well as the integration and control of hydrogen power systems. He has authored 15 papers published in renowned journals such as Energy Conversion and Management and Applied Energy, and holds 11 authorized patents. His research outcomes have been applied in practical projects, including the China-Finland Energy Cooperation "multi-energy integrated" micro-energy grid and SOFC demonstration project in Nansha, Guangzhou, supported by China Southern Power Grid. Additionally, Dr. Xia serves as a reviewer for several international journals, including Energy Conversion and Management, Applied Energy, and the International Journal of Hydrogen Energy. He also acts as a Science and Technology Commissioner in Jiangxi Province.

Presentation Title: Modeling analysis and Optimal Control of Solid Oxide Electrolysis Cell System for Hydrogen Production.

Abstract: Solid Oxide Electrolysis Cell (SOEC) is regarded as one of the most promising electrolysis devices for hydrogen production using renewable energy due to its high efficiency. However, the dynamic control method of the SOEC system, represented by ideal operating conditions, faces challenges such as multi-energy interference, excessive energy consumption, and performance degradation, etc., which makes it difficult to solve scientific problems such as full consumption of renewable energy, sufficient supply of hydrogen, durable operation of the cell stack in the SOEC system in the complex dynamic environment. Therefore, a novel SOEC system is established through multi-reactor expansion and two-stage heat exchange methods. Dynamic and static optimization analysis of the system, performance degradation assessment, and optimization control research under variable load conditions are carried out to achieve safe, efficient, economical and durable operation of the system.

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Prof. Zhenjun Jiao

Harbin Institute of Technology

Prof. Zhenjun Jiao is an expert in Solid Oxide Fuel Cell (SOFC) technology at Harbin Institute of Technology. His current research builds on more than a decade of dedicated work in the SOFC field at the University of Tokyo (2009-2018) and Harbin Institute of Technology (2019-present). Professor Jiao earned his Ph.D. from Nanyang Technological University, Singapore, where his doctoral research focused on microscale liquid propulsion under the guidance of renowned microfluidics expert, Professor Namtrung Nguyen. This foundational training provides him with a unique, cross-disciplinary perspective on fluid dynamics and materials science. An active member of the Japan SOFC Association, he has authored over 70 papers in leading international journals, including Energy & Environmental Science, Acta Materialia, and the Journal of Mechanics Physics Science. He also regularly serves the academic community as a long-term peer reviewer for multiple international journals.

Presentation Title: Quantifying The Mechanical Degradation of Solid Oxide Cells Based on a Unified Multiphysics Coupling Numerical Framework.

Abstract: A multiphysics coupling numerical framework is developed to quantitatively investigate the initial performances of solid oxide cells (SOCs) based on the thermodynamically consistent integration of the phase field method (PFM) to reveal the interaction between species-defect transport, electrochemical reaction kinetics, stress and mechanical damage in SOC electrodes. The modeling framework is validated by comparing the simulation results based on real 3D microstructure reconstructions of specific SOCs with the experimental measurements in electrolysis and fuel cell modes. The phenomena of internal microstructure fracture and delamination observed in the experiment thus can be numerically modeled to quantify the effects of thermal and chemical stresses on the mechanical degradation of heterogeneous electrodes. The framework is also applied in the cross-scale quantification of the possible mechanical damage in SOCs subjected to different mechanical boundary conditions. The framework proposed in this work is flexible, can be superimposed with other fields, and incorporates input from cross-scale simulations. It provides a great potential platform for the optimization of future energy devices considering actual operating conditions and fills the gap in theoretical multiphysics modeling in the field of SOCs.

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Prof. Yuqing Wang

Beijing Institute of Technology

Prof. Yuqing Wang received her BEng degree and PhD from Tsinghua University in 2012 and 2017, respectively. She joined Beijing Institute of Technology as assistant professor (2017-2022), associate professor (2022-2023) and professor (since 2023). Prof. Wang received the Humboldt Fellowship in 2017 and conducted collaboration research as a senior scientist at Karlsruhe Institute of Technology, Germany for one and a half years between 2017 and 2020. Her current research interests include solid oxide cells, multiscale modeling of chemical/electrochemical reaction processes, and distributed energy systems. She has published more than 40 research papers in a wide range of high-quality journals.

Presentation Title: Study on Reaction Mechanism and Transfer Processes of Solid Oxide Cells.

Abstract: Solid oxide cells (SOCs) enable direct and efficient conversion between chemical energy and electrical energy at high temperatures. In fuel cell mode (SOFC), they facilitate clean and efficient utilization of hydrogen and fossil fuels for power generation, while in electrolysis mode (SOEC), the co-electrolysis of H_2O and CO_2 enables large-scale storage of fluctuating renewable energy.

In this presentation, the speaker will focus on the study on mechanism and transfer processes of SOC at multiple levels. Fundamental mechanisms: reaction kinetics and multi-scale simulations to unravel electrochemical processes. Device engineering: advances in efficient cell stacking and thermal management technologies. System integration: dynamic modeling and simulation for optimized performance under real-world conditions.

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Prof. Keqing Zheng

China University of Mining
and Technology

Prof. Keqing Zheng received her Ph.D. from the Hong Kong Polytechnic University in 2016. As a principal investigator, she has led more than 10 research projects, including the National Key R&D Program of China, the National Natural Science Foundation of China, and the China Postdoctoral Science Foundation. Dr. Zheng has achieved significant accomplishments in her research career, with over 70 SCI-indexed publications and 10 authorized Chinese invention patents. Her primary research focuses on multi-physics, multi-scale modeling methodology for Solid Oxide Fuel Cells.

Presentation Title: Modeling and Optimization of Methane-Fueled Solid Oxide Fuel Cell: From Components to System Integration.

Abstract: This presentation will share our research on the modeling and optimization of methane SOFC systems, covering key components including the methane-steam reformer, the stack, and system-scale integration and performance analysis.

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Prof. Yucun Zhou

Huairou Laboratory

Prof. Yucun Zhou is a professor, works at Beijing Huairou Laboratory, China. He received his Ph.D. degree in Materials Physics and Chemistry from Shanghai Institute of Ceramics, Chinese Academy of Sciences in 2015. Then he worked as a postdoctoral researcher in Georgia Institute of Technology and The Chinese University of Hong Kong. His research interests include solid oxide fuel cells and solid oxide electrolysis cells. He is currently focusing on the electrodes and catalysts for reversible solid oxide fuel cells. He has published 1 book and over 90 papers.

Presentation Title: Rational Design of Critical Materials for High-Performance and Durable Reversible Proton-conducting Solid Oxide Cells.

Abstract: Reversible proton-conducting solid oxide cells (R-PSOCs) are one of the most promising techniques for energy conversion and storage due to their potential for efficient, large-scale, long-term, and low-cost power and fuel co-generation. However, the practical applications of R-PSOCs are still hindered by the lack of highly active and robust materials (e.g., electrolyte materials) for dual-mode operation. In this presentation, we will introduce the scientific challenges facing the design of efficient and durable materials for R-PSOCs. We will then present our recent progress in the development of new electrolyte materials as well as the reversible cells. High performance and suitable long-term (>1000 h) stability of the materials and reversible cells will be highlighted.

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Prof. Chengzhi Guan

Hyenergy Tech

Prof. Chengzhi Guan serves as Chief Technology Officer of Hyenergy Tech, as well as Professor of Engineering and head of research group at SINAP. His research primarily focuses on the applied technologies of Solid Oxide Fuel Cells and Solid Oxide Electrolysis Cells. He has led the establishment of a SOC cell production pilot based on tape casting, screen printing, and high-temperature sintering processes, and has directed the R&D of single cells, stacks, and systems. He has authored more than 60 scientific papers and 20 granted patents. He has been selected as a member of the Youth Innovation Promotion Association of the CAS, honored as a Jiading District Youth Talent, and serves as a committee member of the High-Temperature Fuel Cell Standardization Technical Committee in the energy industry.

Presentation Title: Insights and Practices on Engineering Development of SOCs at Hyenergy Tech.

Abstract: Shanghai Hyenergy Technology Co., Ltd. (Hyenergy Tech) acts as the technology commercialization and application platform of the Shanghai Institute of Applied Physics, Chinese Academy of Sciences (SINAP, CAS), in the field of solid oxide fuel cell and electrolysis cell (SOC) technologies. Over the past five years, the company has carried out extensive research and development in core SOC technologies and products, spanning material synthesis, single-cell and stack development, and full system integration. Furthermore, it has performed technical validation and demonstration across multiple application scenarios, such as high-efficiency hydrogen production, CO₂/H₂O co-electrolysis for syngas generation, combined heat and power (CHP) systems, and energy storage. This presentation will provide a concise overview of Hyenergy Tech's hands-on experience in SOC technology development and share key insights gained from translating laboratory research into scalable engineering applications.

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Prof. Jung-Sik Kim

Beihang University

Prof. Jung-Sik Kim is an internationally renowned scientist and academic leader with over 20 years of experience advancing micro-/nano- fabrication, thin film characterization, and MEMS-based design for high-performance mechanical and energy devices. He joined Beihang University in 2021 as a Professor in Energy Technology, following a distinguished 12-year tenure as a Senior Lecturer at Loughborough University, UK. His academic career also includes significant research roles at Imperial College London and the University of Birmingham, where he earned his degrees in Mechanical Engineering. With a strong foundation in both mechanical engineering and materials science from institutions including KAIST and Imperial College London. He specializes in bridging fundamental science with industrial application, a pioneering force in developing stress-optimized thin films, AI-aided smart sensors, and scalable manufacturing processes. He is currently leading projects with Tsinghua/Peking Universities on AI-aided thin-film smart sensors for hydrogen purity detection. His innovations, such as the patented smart thermal sensor technology, have been adopted by global industry leaders including Rolls-Royce, and SWEP.

Presentation title: SOFC for H₂ gas sensors: its scientific foundations, IP & commercialization.

Abstract: In high temperature SOFCs (Solid Oxide Fuel Cells), the performance of the cell can be altered by the variation in the temperature distribution throughout the cell/stack. Conventional thermocouples can provide limited information depending its location in the system. The investigation utilized own developed a multi-junction thermal array (MCTA) sensor to read out the true temperature of the SOFCs whilst working. In this work, the sensitivity of MCTA sensor is assessed. It is directly attached to the cathode surface of the anode-supported SOFC to monitor the temperature of the electrode during temperature ramping, OCV changes during anode reduction. MCTA sensor-based readings reveals an area-selected reduction process as well as the effects of direct oxidation on cell's local temperature.

Beyond this point to exploit the sensor attached SOC, developed an electrochemical fuel cell based sensor for monitoring of gas contents such as hydrogen, in a hydrogen-natural (H₂/NG) gas mixture to determine the calorific value of the H₂/NG mixture. This device traces the hydrogen content within the (predominantly methane) stream, and provides an output current reading which correlates to the level of hydrogen in the stream. Present systems for inspecting gas composition to a necessary accuracy (eg. chromatography) are expensive due to their complexity and are not suitable for use in the field, which impedes their wider adoption. Kim and his group are looking to demonstrate an economical, robust and compact sensing platform which consists of H₂ sensing and temperature sensing that can be deployed in point-of-use environments.

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Guest speaker

报告嘉宾

Invited speakers 受邀演讲嘉宾



Prof. Lan Zhang

Energy Research Institute @
NTU, Nanyang Technological
University

China-Singapore International
Joint Research Institute

Prof. Lan Zhang is a Principal Research Scientist at the Energy Research Institute @ Nanyang Technological University (ERI@N), Singapore, and Visiting Professor at Northwest University. She received her Ph.D. in Materials Science from Shandong University. Her research focuses on low-carbon hydrogen production, carbon nanomaterial co-production, and advanced fuel cell materials, integrating fundamental innovation with industrial application. She pioneered the use of gel-casting for scalable catalyst fabrication, advancing sodium borohydride hydrolysis, methane/ammonia cracking, and SOFC electrodes. Dr. Zhang has led major projects at the China-Singapore International Joint Research Institute, establishing a pilot-scale methane cracking platform and a 3,000-ton/year CNT production facility. She has published over 73 SCI papers (H-index 31) and holds 5 U.S., 10 Chinese, and 2 Singapore patents, several of which have been successfully commercialized.

Presentation title: From Lab to Pilot: Scalable Gel-Casting of Functional Oxides for Solid Oxide Cells and Catalytic Hydrogen Systems.

Abstract: Aqueous gel-casting offers a low-cost and scalable route for fabricating homogeneous oxide powders with controllable morphology and composition. In solid oxide fuel cells, gel-cast perovskite and apatite oxides exhibit enhanced ionic conductivity, redox stability, and microstructural densification at reduced sintering temperatures, outperforming conventional solid-state products. For methane catalytic decomposition, Ni-promoted perovskite catalysts synthesized via gel-casting deliver high CH_4 conversion and carbon yields up to 17 gC gNi⁻¹, enabling turquoise-hydrogen coproduction without CO_2 emission. In NaBH_4 hydrolysis, gel-cast Co_3O_4 and alkaline-earth-modified variants achieve temperature-responsive H_2 generation with activation energies as low as 34 kJ mol⁻¹ and excellent durability in alkaline media. The water-based, solvent-free process has been successfully scaled to ton-level oxide production and >100 h continuous operation, demonstrating strong industrial potential. Gel-casting thus bridges laboratory innovation and pilot-scale manufacturing for next-generation hydrogen and SOFC technologies.

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Guest speaker

报告嘉宾

Invited speakers 受邀演讲嘉宾



Dr. Byung-Ho Yoon

Dentium Co. Ltd.

Dr. Byung-Ho Yoon is the Chief Technology Officer (CTO) of the Future Business Division at Dentium Co., Ltd. in the Republic of Korea. He earned his Bachelor's, Master's, and Ph.D. in Materials Science and Engineering from the prestigious Seoul National University, establishing a deep foundation in advanced ceramics. He has served as a Team Manager, Principal Researcher, and R&D Director at several prominent materials and biomedical companies, including GENOSS Co., Ltd. and the Future Institutes of Materials Science. This diverse experience has honed his expertise in advanced ceramics. Dr. Yoon now applies this deep knowledge to drive innovation across both the biomedical sector and sustainable energy, spearheading Dentium's development of Solid Oxide Fuel and Electrolysis Cells (SOFC/ECs).

Presentation title: Development and Production of Solid Oxide Cells based on Multipotent Zirconia

Abstract: Zirconia (ZrO_2) is a high-performance ceramic material recognized for its unique combination of mechanical strength, chemical stability, and functional versatility. In the field of structural materials, zirconia is widely utilized as a load-bearing and grinding medium, due to its high hardness, wear resistance, and fracture toughness. In biomedical applications, zirconia has gained significant attention in dentistry and orthopedics. Especially, 3 ~ 5 mol% yttria stabilized zirconia has been extensively used in dental crowns, bridges, and implant owing to its excellent biocompatibility, aesthetics, and durability. In the energy sector, zirconia plays a pivotal role in gas sensors, thermal barrier coating and SOFC/ECs. By adjusting the yttria content in zirconia mainly from 8YSZ, we optimized its functional properties for energy applications, and a scalable manufacturing process was developed to enable cost-effective mass production of SOFC/EC cells with anode supporting layer (ASL) which is open to customers for the collaboration to utilize their own composition and structure for scale-up.

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Guest speaker

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Invited speakers 受邀演讲嘉宾



Dr. Shenghui Liu

Shaanxi Zhituo Solid State
Additive Manufacturing Co., Ltd.

Dr. Shenghui Liu earned a B.Eng. in Engineering Physics from Tsinghua University in 2013 and subsequently pursued his M.E. and Ph.D. at the Nuclear Power Institute of China, completing his doctoral studies in 2019. His primary research focuses on fundamental studies in advanced compact heat exchanger design and the development of supercritical CO₂ energy systems. He has secured and led over 10 significant research grants, including projects from the National Natural Science Foundation of China (General and Young Scientists Programs), the Defense Industrial Nuclear Power Technology Innovation Fund, and the CNNC Key Laboratory Fund. His scholarly output is substantial, comprising 43 SCI/EI publications in top-tier journals such as International Journal of Heat and Mass Transfer, Applied Thermal Engineering, and Nuclear Power Engineering.

Presentation Title: The design of PCHE or FPCH for SOFC.

Abstract: The integration of highly efficient and compact heat exchangers is critical for optimizing the performance of Solid Oxide Fuel Cell (SOFC) systems. This paper examines the design and application of two leading micro-channel heat exchangers: the Printed Circuit Heat Exchanger (PCHE) and the Formed Plate Heat Exchanger (FPHE), for key roles such as air preheating and fuel reforming. PCHEs, fabricated via chemical etching and diffusion bonding, offer a monolithic core capable of withstanding the extreme temperatures and pressures of SOFC exhaust, making them ideal for high-pressure hybrid cycles. In contrast, FPHEs, constructed using stamped plates and brazing, provide a cost-effective alternative with lower pressure drop characteristics, advantageous for atmospheric systems. The design analysis focuses on the trade-offs between thermal effectiveness, structural integrity, pressure drop, and manufacturability. Performance is evaluated based on the stringent requirements of SOFC operating conditions, including material selection for high-temperature durability and oxidation resistance. Results indicate that while PCHEs excel in robustness and performance for demanding duties, FPHEs present a compelling solution for applications where system cost and parasitic load are primary constraints, guiding selection criteria for advanced thermal management in SOFC systems.

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Guest speaker

报告嘉宾

Invited speakers 受邀演讲嘉宾



Dr. Siu Fai Au

ELCOGEN

Dr. Siu Fai Au is an international specialist in fuel cells and electrolysis. He received his Masters (1997) and PhD (2002) on MCFC research at Delft University of Technology, and continued as post-doc researcher on SOFC systems at Research Center Juelich. He later joined Nedstack (2005) and was responsible for both application development and European research projects. In 2013 he moved to Switzerland and joined SOLIDpower/SolydEra, developing SOFC applications for among others Microsoft datacenter in Seattle, and multifunctional reversible systems for Shell. In 2018 he moved to China, first at Zotye NE Auto leading the PEM FC stack development for passenger vehicles, and in 2020 he joined China Southern Power Grid and was appointed as Technical Director of the Hydrogen Energy Center of Guangzhou Power Supply Bureau. He recently joined Elcogen where he utilizes his international experience and multidisciplinary know-how to unlock all potential of SOC technology and to enable large-scale SOC deployment.

Presentation title: The industrial scale manufacturing of SOC products in Elcogen's ELCO I, and the roadmap to large scale SOC deployment.

Abstract: Founded in 2001, Elcogen is a manufacturer of clean energy technology that delivers affordable green hydrogen and emission-free electricity. SOC technology is flexible and can be applied to a broad range of residential, industrial, and commercial applications, enabling multiple types of systems to produce and use green energy. With the officially opening of ELCO I, a new state-of-the-art manufacturing facility on the outskirts of Tallinn, Estonia, it marks a pivotal step in scaling up the company's role in the global energy transition.

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Guest speaker

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Invited speakers 受邀演讲嘉宾



Prof. Yan Yang

Sinopec Dalian Research
Institute of Petroleum and
Petrochemicals

Prof. Yan Yang has been recognized through several prestigious programs: Sinopec Group's "Double Hundred Talent Plan" (2022), Liaoning Province's "Young Top Talent" Plan(2018), Dalian's "Leading Talent" (2022), and Dalian's "Outstanding Youth" Plan (2022). She has published over 50 papers in top international journal. She has led 15 research and talent projects as Principal Investigator, including 7 national projects, along with 5 provincial projects. Her current research focuses on electrochemical energy conversion and high-temperature solid oxide fuel cells/electrolyzers.

Presentation Title: Sinopec's SOC Technology for Green Hydrogen Production.

Abstract: Solid Oxide Cell (SOC) technology holds significant application potential for Sinopec, encompassing both Solid Oxide Electrolysis Cells (SOEC) and Solid Oxide Fuel Cells (SOFC). SOEC produces green hydrogen to replace gray hydrogen and utilize refinery waste heat. Conversely, SOFC generates power and heat using oilfield associated gas. Together, they form an integrated green hydrogen-electricity-heat energy platform.

We have built a fully domestic 100 kW SOEC electrolysis pilot plant, which overcomes bottlenecks in heat recovery and hydrogen pressurization. It leads the domestic industry in scale, energy consumption, and efficiency, and a complete process package with an independent IP portfolio has been established.

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Guest speaker

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Invited speakers 受邀演讲嘉宾



Prof. Kongfa Chen

Fuzhou University

Prof. Kongfa Chen has over 20 years of extensive expertise in the design, development, and fundamental study of high-efficiency electrodes for solid oxide cells. He earned his bachelor's, master's, and Ph.D. degrees from the Harbin Institute of Technology between 2000 and 2009. Following his doctoral studies, he worked as a Research Fellow at Nanyang Technological University and Curtin University (2009-2016) before joining Fuzhou University in 2016. As a principal investigator, he has secured more than 10 competitive research grants, including two from the National Natural Science Foundation of China and two from provincial natural science foundations. With over 200 publications in prestigious journals such as *Advanced Functional Materials*, *Applied Catalysis B: Environmental*, and *Electrochemical Energy Reviews*, his work has garnered more than 6,000 citations and an h-index of 45. Furthermore, he has been recognized in the Stanford-Elsevier list of the World's Top 2% Scientists, ranking in both "Career-Long Impact" (2023-2025) and "Single-Year Impact" (2021-2023) categories.

Presentation Title: Direct assembly approach for solid oxide cells: Constructing efficient and durable nanocomposite fuel electrodes.

Abstract: This report presents recent advances in the construction of nanocomposite fuel electrodes for solid oxide cells (SOCs) via a sintering-free direct assembly strategy. This method avoids the conventional high-temperature sintering step for electrode fabrication. By applying a mild polarization current ($<1 \text{ A cm}^{-2}$) under typical SOC operating conditions (600–800 °C), the electrode/electrolyte interface can be constructed in situ, effectively inhibiting metal particle sintering and coarsening, thereby improving electrode operational stability. The direct assembly approach also offers a new route for fabricating highly efficient and stable nanocomposite fuel electrodes. Through tailored metal–ceramic interactions in the nanocomposite powders, both the electrochemical performance and long-term stability of the electrodes are significantly enhanced. Additionally, this report discusses the application of nanocomposite hydrogen electrodes in direct ammonia, direct methane, and carbon dioxide electrolysis.

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Guest speaker

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Prof. Chen Zhang

Shanghai Jiao Tong University

Prof. Chen Zhang is a tenure-track Associate Professor at the College of Smart Energy, Shanghai Jiao Tong University (SJTU). He received his B.S. from SJTU, M.S. from Stanford University, and Ph.D. in Mechanical Engineering from the University of Minnesota. Prior to joining SJTU, he worked as a Research Scientist at the U.S. National Renewable Energy Laboratory (NREL). His research interests include power-to-fuel synthesis and utilization, data-mechanism hybrid algorithms, renewable-driven propulsion and power systems, and intelligent energy systems. Dr. Zhang has led multiple national and provincial research projects, including the National Natural Science Foundation (General Program and Excellent Young Scholars – Overseas) and the Shanghai Municipal Major Science and Technology Special Project (Subproject). He has published extensively in top-tier journals such as Applied Energy, Energy Conversion and Management, International Journal of Hydrogen Energy, and Energy.

Presentation Title: Energy Management Strategies and System Integration for High-Efficiency Power-to-Fuel Systems.

Abstract: The development of high-efficiency Power-to-Fuel (PtF) systems is essential for achieving carbon neutrality and enabling large-scale utilization of renewable electricity. This presentation introduces recent progress on energy management and system integration for solid oxide co-electrolysis-based e-fuel production systems. A multi-time-scale dynamic model has been established to describe the complex coupling among the co-electrolysis stack, Fischer-Tropsch synthesis unit, and heat recovery subsystems under fluctuating renewable power inputs.

An energy management framework based on thermal integration optimization is developed to coordinate heat, power, and mass flows throughout the PtL process, thereby enhancing overall efficiency and operational robustness. For real-time control, an adaptive model predictive control (MPC) strategy combined with neural network-assisted modeling is proposed to capture nonlinear system dynamics and ensure stable operation under variable load conditions.

A kilowatt-scale renewable synthetic fuel system demonstration has been conducted to validate the feasibility of the proposed control algorithms and integration strategies, demonstrating their effectiveness in maintaining stable system operation and efficient energy conversion under dynamic renewable energy scenarios.

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Guest speaker

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Prof. Sajid Rauf

Shenzhen University

Prof. Sajid Rauf is currently working at College of Mechatronics and Control Engineering, Shenzhen University, China as a Full-time Associate Researcher. He received his doctoral degree from the Faculty of Physics and Electronics Sciences, Hubei University, Wuhan, China. Afterwards, he completed his postdoctoral fellowship from Shenzhen University. His main research interests include the design of electrolytes and oxygen reduction electro-catalysts and for fuel cells and nanostructured functional materials for energy devices. He has published in high impact prestigious journals such as Nano-Micro Letters, Advanced Science, Chemical Engineering Journal, Energy & Environmental Science, Energy & Environmental Materials etc. in his research area.

Presentation title: Effective surficial proton transport through surface vacancy engineering of $\text{SrTiO}_{3-\delta}$.

Abstract: Overcoming the limitations of ceramic fuel cells (CFCs) requires the development of electrolytes capable of efficient proton transport at reduced operating temperatures. In this work, we introduced a surface-engineered $\text{SrTiO}_{3-\delta}$ electrolyte coated with 10 mol%- CeO_2 , forming a core-shell heterostructure that promoted the formation of oxygen vacancies localized at the interface. These vacancies significantly reduced the energy barrier for proton migration, enabling enhanced ionic conductivity at low operating temperatures. The 10 mol%- CeO_2 -coated $\text{SrTiO}_{3-\delta}$ exhibited a high ionic conductivity of 0.14 S cm^{-1} and delivered a peak power density of 0.81 W cm^{-2} at 550°C . Isotopic substitution and proton-blocking membrane experiments confirmed a dominant protonic conduction mechanism, contributing up to 78 % of the total power-output. Density functional theory calculations revealed that the CeO_2 coating layer lowered the oxygen vacancy formation energy to 3.7 eV and facilitated charge redistribution favorable to proton transport. This work established a scalable and cost-effective surface modification strategy to realize high-performance electrolytes for low-temperature CFCs, surpassing conventional bulk doping approaches in both conductivity and electrochemical output.

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About the Shanghai Institute of Applied Physics, Chinese Academy of Sciences (SINAP, CAS)

Established in 1959, the Shanghai Institute of Applied Physics (SINAP) of the Chinese Academy of Sciences stands as a national institution at the forefront of comprehensive nuclear science and technology. Originally known as the Shanghai Institute of Nuclear Research before its renaming in June 2003, SINAP has a rich history of pioneering research and development that has significantly contributed to China's scientific advancement.

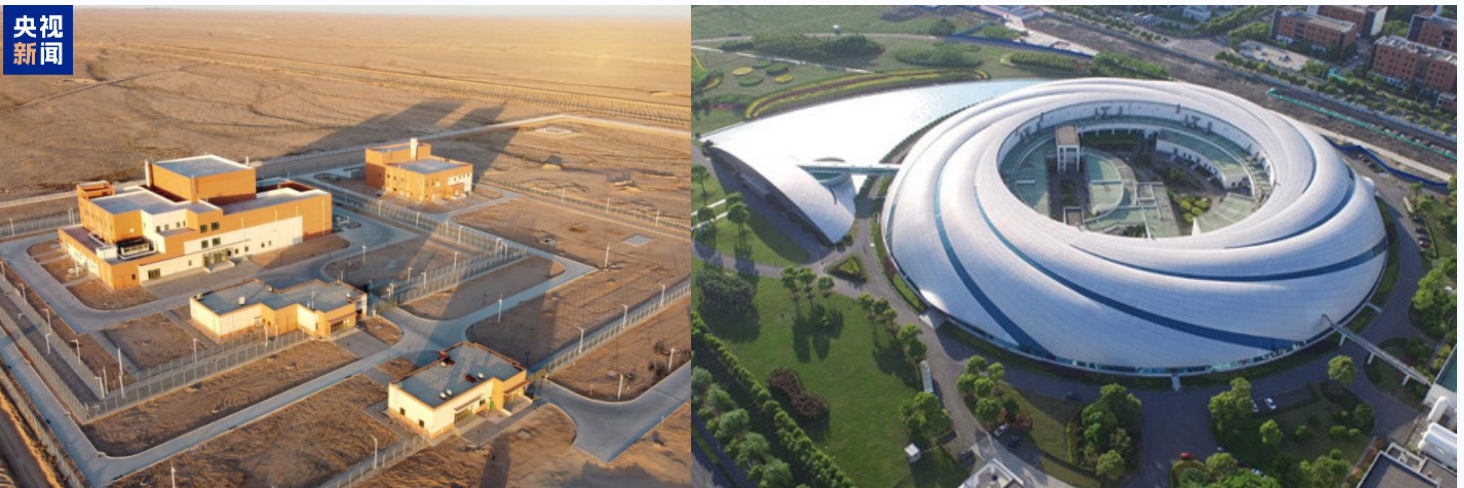
Campus in Jiading, Shanghai

The institute operates across two campuses. The main campus, located in the Jiading district of Shanghai, spans 27 hectares and serves as a key pillar of the Shanghai Technology Innovation Center. Complementing its primary research hub, SINAP also maintains a significant presence in Wuwei, a historic city that was a central hub of the famous Silk Road in ancient Chinese history in Gansu Province. This dual-campus structure allows SINAP to leverage both the modern, dynamic environment of Shanghai and the unique geographical advantages of its western China location.

Research team of SINAP

SINAP is defined by its leadership in large-scale, cutting-edge scientific projects and its focused research programs. The main research fields of the institute include advanced energy science and technology, represented by its groundbreaking work in molten salt reactors, efficient energy storage and conversion technologies, and the vital application of nuclear technology in the environmental and health sectors.





TMSR nuclear energy system

One of the institute's most prominent initiatives is the Thorium-based Molten-Salt Reactor (TMSR) nuclear energy system. As one of the Chinese Academy of Sciences' Strategic Priority Research Programs, the TMSR project is a cornerstone of SINAP's mission. The primary goal is to develop the fourth-generation fission reactor nuclear energy system, which utilizes a thorium-uranium fuel cycle. This advanced technology is being developed with a clear vision for industrial applications within the next 20 years, positioning SINAP as a global leader in next-generation nuclear energy.

Synchrotron Radiation Facility

Further cementing its status as a premier research institution, SINAP established the Shanghai Synchrotron Radiation Facility (SSRF), the largest and most significant research project in modern-day China. The SSRF is a high-performance light source representing the third generation of median electron energy. After its groundbreaking ceremony on December 25, 2004, a project jointly proposed and supported by the Chinese Academy of Sciences and the Shanghai Municipal Government, the facility was completed on schedule in April 2009. For over a decade, the SSRF has been operated efficiently and successfully by SINAP, providing an indispensable tool for scientists across numerous disciplines.



关于中国科学院上海应用物理研究所

中国科学院上海应用物理研究所（SINAP）成立于1959年，是立足于综合性核科学技术前沿的国家级研究机构。其前身为上海原子核研究所，2003年6月更名为上海应用物理研究所。在悠久的发展历史中，SINAP的开创性研究与开发工作为中国的科学进步做出了重大贡献。

上海嘉定园区

该研究所在两个园区运行。主园区位于上海市嘉定区，占地27公顷，是上海科技创新中心的重要支柱。作为主要科研中心的补充，SINAP同时在甘肃省武威市（古丝绸之路上的历史重镇）设有重要基地。这种双园区结构使得SINAP能够同时利用上海的现代化、充满活力的环境以及其在中国西部的独特地理优势。

上海应物所科研团队

上海应用物理研究所的定位体现在其于大型尖端科学项目和重点研究计划中的领导力。研究所的主要研究领域包括先进能源科学与技术（其标志性工作为熔盐反应堆）、高效能源存储与转换技术，以及核技术在环境和健康领域的重要应用。





钍基熔盐堆核能系统

中国科学院上海应用物理研究所(SINAP)成立于1959年,是立足于综合性核科学技术前沿的国家级研究机构。其前身为上海原子核研究所,2003年6月更名为上海应用物理研究所。在悠久的发展历史中,SINAP的开创性研究与开发工作为中国的科学进步做出了重大贡献。

上海同步辐射光源

该研究所在两个园区运行。主园区位于上海市嘉定区,占地27公顷,是上海科技创新中心的重要支柱。作为主要科研中心的补充,SINAP同时在甘肃省武威市(古丝绸之路上的历史重镇)设有重要基地。这种双园区结构使得SINAP能够同时利用上海的现代化、充满活力的环境以及其在中国西部的独特地理优势。



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