

EI Seminar

Fuel Cell and Water Electrolyzer Key Materials: Progress and Challenges from R&D to Industrialization

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Time 11 am – 12 noon

Venue Room 3598 (near Lifts 27-28),
HKUST, ([Location](#))

Abstract

Hydrogen energy is an abundant, green, low-carbon, and widely used secondary energy source that is gradually becoming one of the crucial carriers for global energy transformation and development. To help achieve peak carbon emissions and carbon neutrality goals, it is imperative to accelerate breakthroughs in core hydrogen energy technologies and key material bottlenecks, speed up industrial upgrading and expansion, and realize a virtuous cycle and innovative development of the industrial chain. This report explores the R&D and production of key materials for proton exchange membrane fuel cell technology, such as catalysts and membrane assembly electrodes. It aims to improve the performance and batch production capabilities of key materials through technological innovation and engineering means, continuously enhance the level of core technologies, and ultimately improve the reliability, stability, and durability of fuel cells.

At the same time, driven by the dual carbon goals, water electrolysis hydrogen production technology combined with renewable energy is becoming the core pathway for green hydrogen production. This report explores the anion exchange membrane water electrolysis (AEMWE) technique, which uses pure water or a low-concentration alkaline solution as the electrolyte and cheap non-precious metal catalysts and hydrocarbon membranes to produce hydrogen. It has the advantages of low cost, quick start-stop, and low energy consumption. AEMWE combines the technical advantages of traditional alkaline tanks and proton exchange membrane water electrolysis (PEMWE). It is cheap and efficient, maintenance-free, and suitable for the power fluctuations of wind and solar energy, providing a feasible technical solution for large-scale, low-cost green hydrogen production. This report will discuss key materials' research and industrialization path for AEMWEs and analyze its technological advantages, challenges, and future development directions.

About the Speaker



Dr. Guanxiong Wang currently works at Shenzhen Academy of Aerospace and Technology, focusing on the research, development, and industrialization of key materials for PEM fuel cells and water electrolyzers. He has been honored with the title of National-level Talent (Youth) and serves as an industrial supervisor for graduate students at University of Science and Technology of China and Southern University of Science and Technology, and a technical expert at the Guangdong Standardization Association. Dr. Wang possesses extensive experience in the R&D and production of electrocatalysts and membrane assembly electrodes (MEAs) for fuel cells and water electrolyzers. He is expertized in the preparation, evaluation, and continuous production of both platinum and non-platinum catalysts for fuel cells. Dr. Wang is skilled in the design of catalyst layers, optimization of electrode structures, and performance tests on MEA platforms for fuel cells and water electrolyzer. He has mastered advanced techniques for the preparation and batch production of MEAs.

All are Welcome