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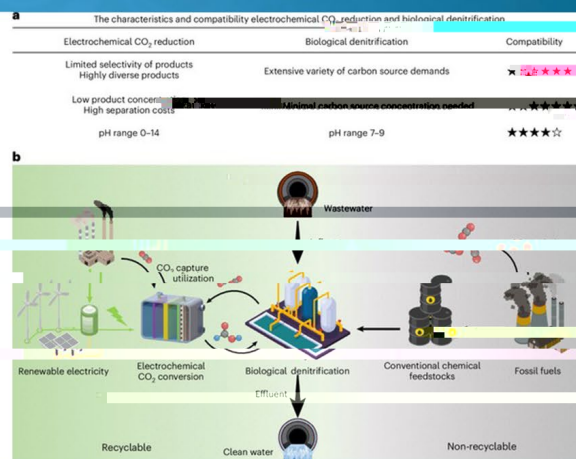
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Realizing the practical application of CO₂ electroreduction for urban wastewater denitrification

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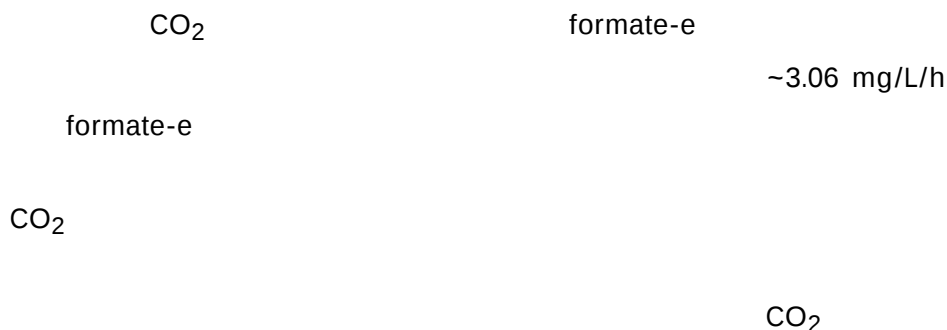


The team led by Professor Chen Guangxi and Professor Qiu Guanglei of South China University of Technology (SCUT) published a paper titled "Realizing the practical application of CO₂ electroreduction (CO₂RR) for urban wastewater denitrification" in the top-tier journal **Nature Water**. Based on a detailed comparison of the CO₂RR system and municipal wastewater denitrification, the team

proposed a novel electrochemical–biological hybrid system that merges CO₂ electrolysis with municipal wastewater denitrification.

"Realizing the practical application of CO₂ electroreduction for urban wastewater denitrification" *Nature Water*
CO₂RR -

In this hybrid system, CO₂ was efficiently and electrocatalytically converted into formate (formate-e), which directly serves as the carbon source and energy carrier for biological denitrification. Results show that the system achieves an excellent nitrate nitrogen (NO₃⁻-N) removal rate (~3.06 mg L⁻¹h⁻¹). Moreover, after long-term continuous operation of the tailored denitrification bioreactor, formate-e exhibits a higher denitrification rate than acetate, a widely used commercial carbon source. Further environmental and techno-economic analyses indicate that integrating this electrochemical–biological hybrid system with an electrochemical recovery and separation system can significantly reduce electrolyte costs, thereby enabling large-scale application of the hybrid system. This research offers a novel approach for the coordinated development of CO₂ mitigation and urban wastewater treatment and demonstrates the significant potential of directly applying electrochemical products in environmental governance. With ongoing engineering design optimization, the system holds promise of achieving both technical and economic viability. More importantly, by recycling and utilizing CO₂ released from sources such as thermal power generation, sludge or waste incineration, and biological denitrification processes as a reaction feedstock, the system is expected to achieve net-zero or even carbon-negative emissions.





On October 13, the on-site finals of the China International College Students' Innovation Competition 2025 (CICSIC 2025) were held at Zhengzhou University. SCUT advanced to the finals with seven projects, winning six gold medals and one silver medal, ranking first among universities in Guangdong Province and among the top nationwide in terms of the number of gold medals.

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The CICSIC 2025 is a global event jointly organized by the Ministry of Education and 11 other departments. With the theme of "Dare to Differ, Dare to Win", the event has attracted 6.19 million projects and 24.43 million participants from 5,673 universities across 161 countries and regions worldwide, further enhancing its role as a great platform uniting "hundreds of countries, thousands of colleges, and millions of people".

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	161	5673	619	2443	"	"

Gold Medal-winning projects:

Fast-Charging Pioneer: Ester Polymer-Based Solid-State Lithium Batteries—School of Chemistry and Chemical Engineering, SCUT

Pioneer of Next-Gen Magnetic Storage Chip Architecture—School of Microelectronics, SCUT

Multimodal and IoT Large Model for Intelligent Connectivity—School of Mechanical & Automotive Engineering, SCUT

Rural Revitalization Pioneer Empowered by Targeted Recovery of Valuable Metals from Water Bodies in Mining Area—School of Environment and Energy, SCUT

High-Efficiency and High-Performance Metal Micro- and Nano-Manufacturing with Non-Uniform Double-Beams—School of Mechanical & Automotive Engineering, SCUT

Intelligent Robot System for Brain-Computer Interface—Shien-Ming Wu School of Intelligent Engineering, SCUT



From October 24 to November 2, Zhang Xichun, Chancellor of SCUT, led a delegation to Peru, aiming to advance the "going global" initiative of SCUT's National School for Elite Engineers and jointly shape a new ecosystem for global engineering education with partner universities. This visit significantly expanded SCUT's cooperation with leading universities in Peru, Turkey and Brazil.

The delegation visited the National University of San Marcos—the oldest university in the Americas and a member organization of the China–Peru Institute for Excellent Engineers—and unveiled the establishment of the Institute. The delegation also visited Istanbul Technical University and Boğaziçi University in Turkey, as well as the State University of Campinas and the University of São Paulo in Brazil, holding friendly discussions on further inter-university cooperation. Additionally, the delegation collaborated with leading Chinese companies operating overseas, such as Huawei, BYD, and China Southern Power Grid, exploring the construction of an innovative community through tripartite collaboration among SCUT, Chinese enterprises, and local universities, aiming to achieve innovation in both cooperation regions and models.



From October 29 to 31, the 26th China Annual Conference & Expo for International Education (CACIE 2025), themed "Bridging Education and Beyond", was held in Beijing. Li Weiqing, Vice President of SCUT, attended the CACIE, and delivered a keynote speech entitled ***SCUT's Practice in Cultivating International Excellent Engineers*** at one of the side events—the 2nd New Zealand-China High-level Education Forum. Li shared SCUT's innovative practices in developing a model for cultivating excellent engineers to address global challenges, which resonated widely with attendees.

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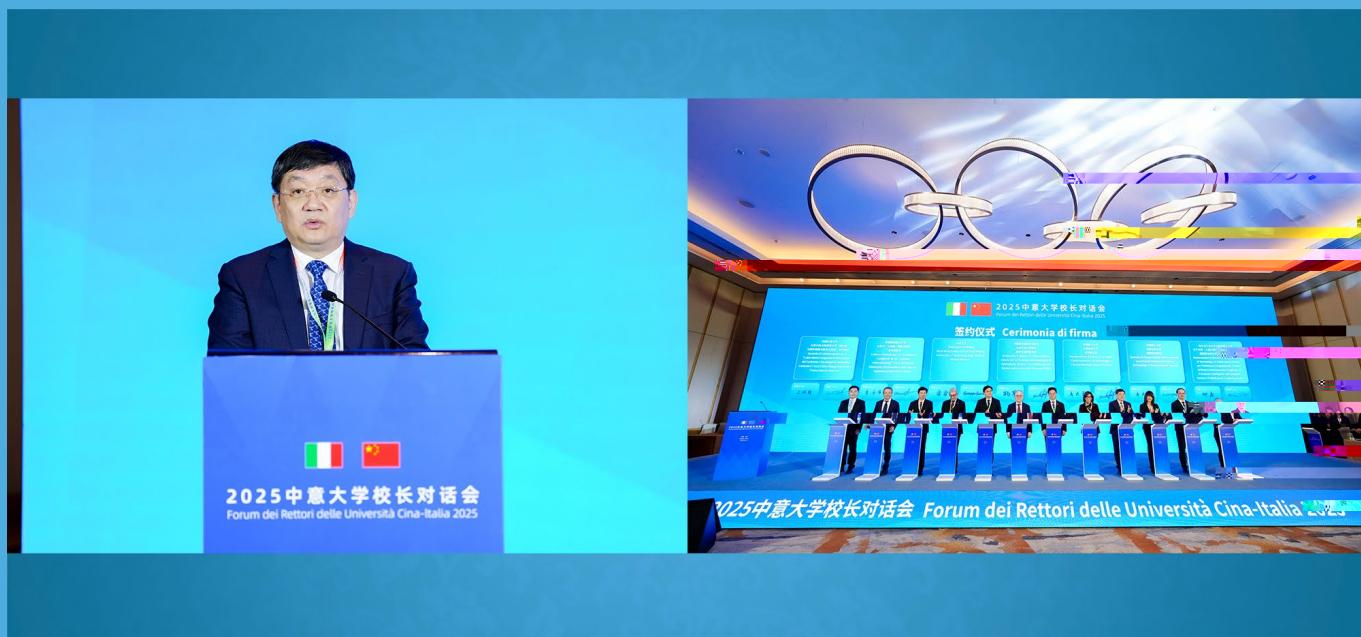
It is reported that the CACIE 2025 brought together education leaders, experts, scholars, and industry representatives from more than 70 countries and regions worldwide to explore new trends and opportunities in global education development.



On October 30, Dr. Yuan Biao, a postdoctoral researcher, and Professor Han Yu of South China University of Technology (SCUT) published a co-authored study titled "Atomically resolved edges and defects in lead halide perovskites" in *Nature*.

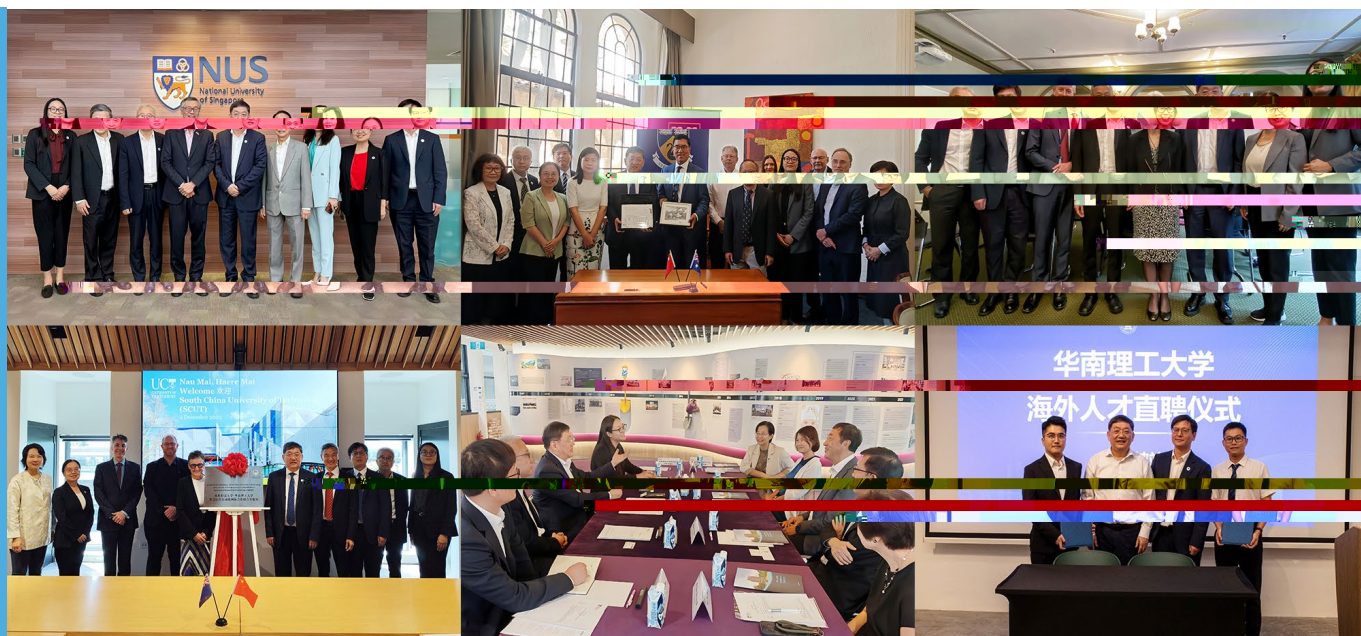
10 30 "Atomically resolved edges and defects in lead halide perovskites" *Nature*

The team employed an event-driven direct electron detector to acquire data under ultralow electron doses and, together with an advanced electron ptychography method, achieved the first direct atomic-scale imaging of the crystal edges and defect structures in the hybrid perovskite methylammonium lead iodide (MAPbI₃), elucidating the dynamic mechanisms of beam-induced structural degradation. In addition to resolving the edge-termination modes of MAPbI₃, the study identifies iodine vacancies as the key defects that trigger structural deterioration. Beyond providing direct evidence for the microscopic origins of instability in hybrid perovskites, the results highlight the methodological value and broad potential of ultralow-dose atomic imaging for studying electron-beam-sensitive materials.



On November 13, under the theme of "Advancing Interdisciplina

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From November 27 to December 6, Tang Hongwu, President of SCUT, led a delegation to Singapore, Australia, and New Zealand, to deepen cooperation and exchanges with world-class universities.

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During the visit, President Tang and his delegation paid visits to world-class universities, including the National University of Singapore, Nanyang Technological University, the University of Western Australia, the University of Auckland, and the University of Canterbury. During the visit, multiple agreements on talent development and research cooperation were signed, and the "University of Canterbury - South China University of Technology International Joint Laboratory on Smart Medtech Automation Research and Technology (SMART)" was formally inaugurated. Focusing on new models of cooperation, the delegation explored forward-looking initiatives such as establishing micro-campus, organizing overseas training programs for administrative staff, promoting reciprocal faculty appointments and exchanges, and jointly exploring alumni-donated land in New Zealand to advance industry–university–research integration. These efforts further strengthened and expanded SCUT's strategic partnerships with leading universities in Singapore, Australia, and New Zealand, injecting new momentum into the establishment of an all-round, multi-level and effective international cooperation framework.



On December 6th, the final of the Salubris Cup 12th National College Student Contest of Chemical Engineering Safety Design and the Chemical Engineering Safety Education Forum were held at SCUT. The SCUT team "Verdant Vigor" won the special prize with their project "Annual Production of 80,000 Tons of 1,4-Butanediol from Maleic Anhydride via esterification and hydrogenation".

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This event (forum) was hosted by the Chemical Industry and Engineering Society of China, organized by SCUT, and co-organized by Shenzhen Salubris Pharmaceuticals Co., Ltd. It aims to build an open platform for enterprises and universities to exchange ideas on chemical safety technology and chemical safety talent education. More than 200 teams from universities across the country participated in the contest.



On December 15, the 2025 BWF AirBadminton World Cup was held in Sharjah, United Arab Emirates.

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