Report

Winter School on Electrocatalysis 2026

From February 2-6, 2026, the Applied Electrochemistry and Catalysis (ELCAT) at the University of Antwerp organized a Winter School in Antwerp, Belgium. The program was dedicated to fundamental principles and applied aspects of water and CO_2 electrolysis. Here, lectures from various academic and industrial (Prof. Tom Breugelmans, Prof. Amanda Garcia, Prof. Marc Koper, Prof. Nejc Hodnik, Prof. Gabriele Centi, Dr. Raymond Thür, Dr. Guenter Schmid, Prof. David Vermaas, Dr. Daniel Choukroun, Prof. Joris Proost, and Dr. Gerard Montserrat Sisó) were provided to highlight the state-of-the-art in water and CO_2 electrolysis, complemented by practical sessions provided by ELCAT and Metrohm.

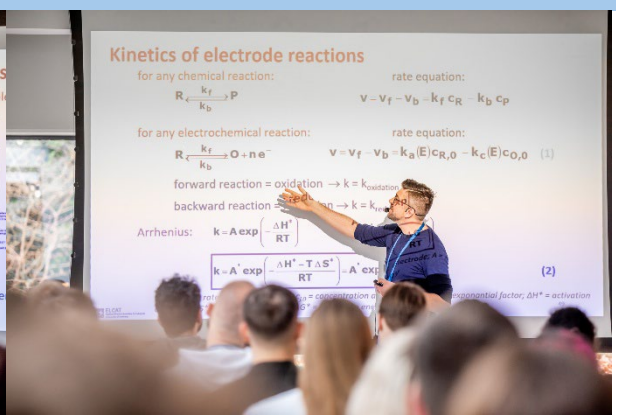
The Winter School attracted considerable interest from early-career researchers (master's and early PhD students), bringing together more than 70 eligible participants from Europe, the Middle East, and Australia. Among these participants, two master's students from Politecnico di Torino (POLITO) were supported using the ISE sponsorship to ensure an equal opportunity for the next generation of researchers to experience this comprehensive program.

The first day covered electrochemical fundamentals and introduced core thermodynamic and kinetic concepts and equations, Nernst and Butler-Volmer equations. This was followed by a discussion of applied electrochemical characterization techniques (LSV, CV, EIS, *etc*.), linking theory to practical approaches. Prof. Amanda Garcia emphasized the importance of performing the various electrochemical characterization techniques correctly to ensure reliable and reproducible data generation; of significance for young researchers. The subsequent lectures immersed the participants in the state-of-the-art of water and CO_2 electrolysis. These lectures progressed from fundamental electrocatalysis strategies to industrial implementation, reactor engineering, and system upscaling. This structure enabled participants to develop a coherent understanding of electrochemical principles, electrocatalyst design, engineering constraints, and techno-economic and valorization perspectives. Laboratory-scale demonstrations and interactive sessions by ELCAT and Metrohm provided an additional opportunity for discussion, hands-on learning, and networking among participants and researchers.

Building on the success of this edition, the Winter School will be organized again in 2028 to continue supporting the development of the next generation of electrochemistry researchers.

Pictures:

Monday (KAVA Congres Centrum)



Prof. Tom Breugelmans (University of Antwerp):

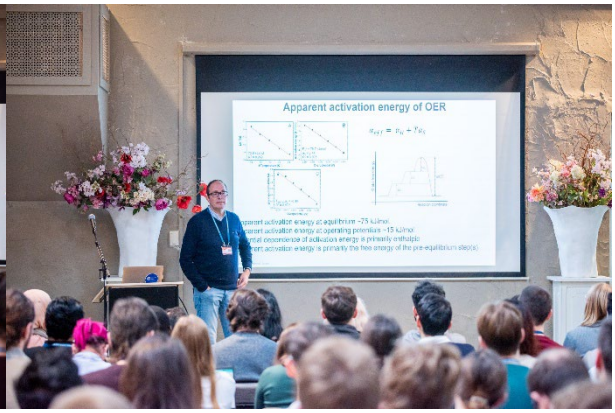
10:30-12:30 Electrochemistry: Basic Principles

14:00-16:00 Electrochemistry: LSV, CV, R(R)DE, EIS

Prof. Amanda Garcia (University of Amsterdam):

16:00-18:00 Good Practices in Electrochemistry

Tuesday (Afspanning de Jachthoorn) + ELCAT research labs



Prof. Marc Koper (Leiden University)

8:30-10:30 Fundamentals of Electrocatalysis

Prof. Nejc Hodnik (National Institute of Chemistry)

10:30-12:30 Insights into Hydrogen Production




Practical Sessions by ELCAT and Metrohm

14:00-18:00 -

Wednesday (Afspanning de Jachthoorn) + ELCAT research labs

Prof. Gabriele Centi (University of Messina)

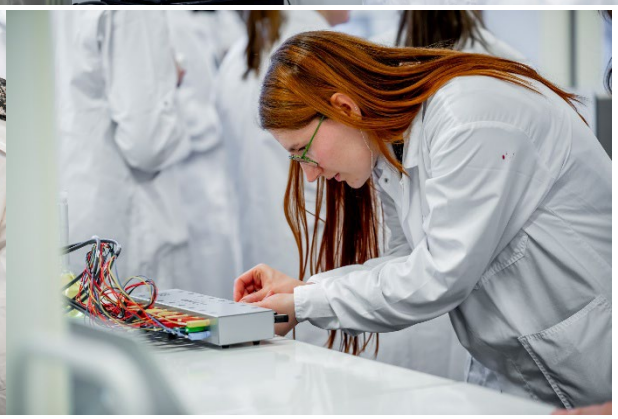
8:30-10:30 Electrocatalysis for CO_2 Electrolysis

Dr. Raymond Thür (Agfa-Gevaert)

10:30-12:30 The Industrial Development of Membranes for Hydrogen Production and CO_2 Electrolysis







Practical Sessions by ELCAT and Metrohm

14:00-18:00 -

Thursday (KAVA Congres Centrum)

Dr. Guenter Schmid (Siemens Energy)

8:30-10:30 Scaling and Production Ramp-up, the Major Challenges for the Upcoming Electrochemically-based Economy

Prof. David Vermaas (Delft University of Technology)

10:30-12:30 Heat and Mass Transport in Flow Cells for CO_2 Electrolysis

Dr. Daniel Choukroun (University of Antwerp)

14:00-16:00 Mass Transport and Process Conditions for CO_2 Electrolysers from Laboratory Scale to Pilot Scale

Friday (KAVA Congres Centrum)

Prof. Joris Proost (UCLouvain)

8:30-10:30 Flow-engineered Cells and 3D Electrodes for Enhanced Bubble Evacuation During Alkaline Water Electrolysis

Dr. Gerard Montserrat Sisó (University of Antwerp)

10:30-12:30 Engineering Strategies for Efficient Hydrogen Evolution: Linking Cell Design, Operation, and System Performance