

CHEMICAL ENGINEERING

DISAT - Advanced Durability Testing and Multiscale Modeling of Anion Exchange Membrane Electrolysis (AEMEL)

Funded By	Dipartimento DISAT
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Context of the research activity	Focus on developing advanced durability testing methods and multiscale models to enhance AEMEL cells' long-term performance. Objectives include creating accelerated stress tests, integrating molecular insights with system-level models, optimizing catalyst and membrane interactions, and validating models with experimental data. This research aims to improve the stability and efficiency of AEMEL systems for sustainable energy applications.
Objectives	<p>This PhD project, part of the ELECTROLIFE EU Project, focuses on the advanced durability testing and multiscale modeling of Anion Exchange Membrane Electrolysis (AEMEL) cells. The research aims to enhance the long-term performance and operational stability of AEMEL systems by comprehensively understanding degradation mechanisms and developing innovative strategies for material and interface optimization. The key objectives include:</p> <p>Developing Advanced Durability Testing Protocols: Establish new methods for accelerated stress testing and in-situ diagnostics to evaluate the lifespan of AEMEL components under realistic operating conditions.</p> <p>Multiscale Modeling and Simulation: Create comprehensive models that integrate molecular-level insights with macroscopic performance metrics to predict the durability and performance of AEMEL systems over extended periods.</p> <p>Material and Interface Optimization: Investigate the interactions between catalysts, membranes, and transport layers to identify and mitigate factors that limit the stability and efficiency of the electrolyzer.</p> <p>Experimental Validation: Conduct experimental studies to validate model predictions and refine testing protocols, ensuring they accurately reflect real-world operating conditions.</p> <p>For more information, visit the ELECTROLIFE project at https://electrolife-project.eu/.</p>
Skills and competences	Qualifications: Master's degree in Chemical Engineering, Energetic

**competencies
for the
development of
the activity**

Engineering, Material Engineering or related fields. Proficiency in computational modeling (i.e Matlab, COMSOL), strong analytical skills, and English fluency are required.