

# CHEMICAL ENGINEERING

## DISAT – Advanced Durability Testing and Performance Optimization of Anion Exchange Membrane Electrolysis (AEMEL) Systems

Funded By	Dipartimento DISAT
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Context of the research activity	<p>The research focuses on developing advanced durability testing methods and in-situ monitoring tools to enhance the long-term performance of Anion Exchange Membrane Electrolysis (AEMEL) cells. Key objectives include designing accelerated stress testing protocols, integrating molecular-level insights with system-scale models, optimizing catalyst–membrane interactions, and validating these models through experimental data. The overarching goal is to improve the stability and efficiency of AEMEL systems, contributing to the advancement of sustainable energy technologies.</p>
Objectives	<p>This PhD position, within the framework of the ELECTROLIFE EU Project, focuses on advanced durability testing and multiscale modeling of Anion Exchange Membrane Electrolysis (AEMEL) cells. The research aims to improve the long-term performance and operational stability of AEMEL systems through a comprehensive understanding of degradation mechanisms and the development of innovative strategies for material and interface optimization.</p> <p>Key Objectives:</p> <ul style="list-style-type: none"><li>-Advanced Durability Testing: Develop and implement novel protocols for durability assessment.</li><li>-Accelerated Stress Testing &amp; Diagnostics: Establish new methods for accelerated stress testing and in-situ diagnostic tools to evaluate the lifespan of AEMEL components under realistic operating conditions.</li><li>-Material and Interface Optimization: Investigate the interactions between catalysts, membranes, transport layers, and operating modes to identify and mitigate factors limiting the stability, safety, and efficiency of the electrolyzer.</li><li>-Experimental Validation: Perform experimental studies on W- and kW-scale plants to validate model predictions and refine testing protocols, ensuring accurate representation of real-world operating conditions.</li></ul> <p>For more information, please visit the ELECTROLIFE Project website: <a href="https://electrolifeproject.eu">https://electrolifeproject.eu</a></p>

**Skills and competencies for the development of the activity**

Master's degree in Chemical Engineering, Energy Engineering, Materials Engineering, or a related field. Proven proficiency in electrochemical testing and chemical plant operations, strong analytical abilities, and fluency in English are required.