



## **Project progress - D2.5. Details on DESA configuration and design**

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Within the ALCHEMHY project, the direct electrochemical synthesis of ammonia (DESA) is being explored as one of the four core technologies for sustainable hydrogen-based processes. The Deliverable D2.5, entitled “Details on DESA configuration and design”, focuses on the definition of the system architecture of the DESA technology.

This part of the work takes the previously identified functional materials and components as a starting point and considers how they can be combined into a functional device concept. At this stage, the emphasis is on identifying the main parameters shaping the system, including operating conditions and cell configuration for DESA-relevant environments.

Building on Deliverable D2.4, which addressed the development of advanced electrodes and electrolytes, the present work establishes a link between material-level results and system-level design considerations. This step helps to ensure that the selected materials can be effectively translated into functional electrochemical-based technical solutions.

Rather than converging on a single configuration, the approach explores different possibilities and boundary conditions. This allows the main constraints to be outlined while keeping enough flexibility for subsequent development. In parallel, the relation between materials behaviour and device-level response has been considered in general terms, mainly to anticipate integration issues and avoid incompatibilities.

What emerges from this work is a first framework for the design of the DESA technology, including aspects related to scalability and practical implementation. At this stage, the results mainly serve to clarify system requirements and to support the next steps of development, moving towards more robust and efficient configurations for ammonia synthesis.

These outcomes will be further consolidated in Deliverable D2.8, “Details on DESA configuration and design. Final”, where the design approach will be refined as the project progresses.



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