

## Advancing Standardization in Liquid Alkaline Water Electrolysis

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Alkaline water electrolysis (AWE) is a scalable and cost-effective method for hydrogen production. Despite the expanding research on AWE, the lack of standardized experimental conditions, baseline materials, and testing protocols continues to impede reproducibility and comparability.

This study addresses these challenges through standardized hardware and the development of protocols under Task 30 of the International Energy Agency's AFC TCP program. A harmonized setup was collaboratively developed. This setup was tested by eleven institutions across Europe and North America. Initial results from the first phase revealed significant disparities between laboratories, with iron content in the electrolyte and temperature control as key factors. A second phase of experiments further investigates the observed differences. The impact of temperature on performance was assessed using precise heating control mechanisms. Additionally, the influence of iron contamination was examined by replacing the Ni electrode with a NiFe electrode, isolating the impact of iron and offering deeper insights into the mechanisms behind performance variability. The findings underscore the critical need for rigorous control of detail in experiment and reporting and pave the way for accelerated advancements in AWE.

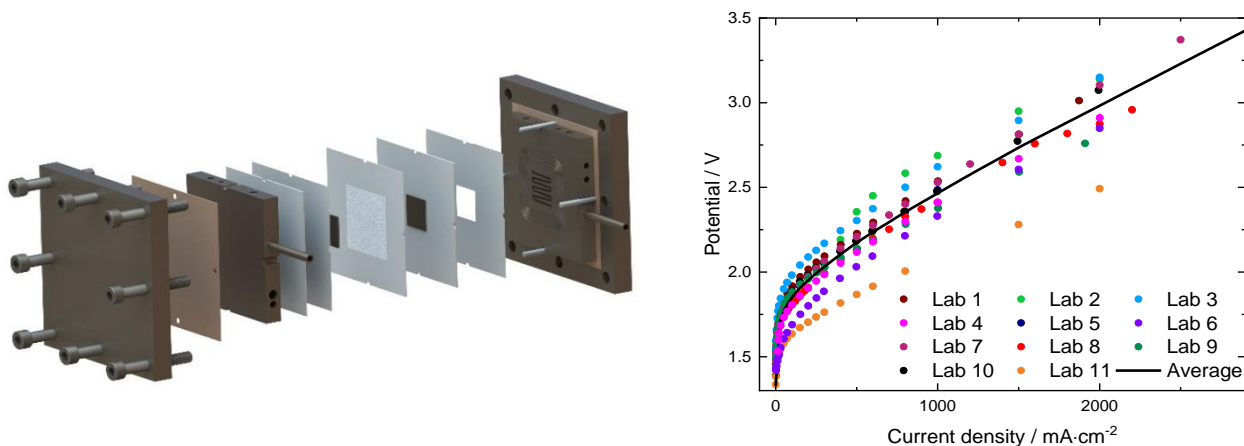


Figure 1. The AWE test cell (left) and comparison of the IV curves of the first phase in the different laboratories at 80 °C (right). [1]