Aachen Hydrogen Colloquium

Zukunftscluster Wasserstoff

Call for Abstracts

Aachen Hydrogen Colloquium 2024

The „Zukunftscluster Wasserstoff“ invites you to submit your abstract for a presentation at the Aachen Hydrogen Colloquium 2024.
The conference will focus on the following hydrogen related topics:

- Generation via electrolysis and others
- Storage and transport
- Usage in the mobility sector
- Usage in industry
- Economy, LCA and social acceptance

May 14 & 15, 2024 in Aachen

Deadline abstract submission:
January 31, 2024

Notification on acceptance:
March, 2024

Please send the abstract or address your questions to: colloquium@h2-cluster.de

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Abstract

Topic	Generation via electrolysis and others
Keyword(s)	Alkaline Water Electrolysis, Characterization, Renewable Energy
Title of abstract	Hydrogen Generation through Alkaline Water Electrolysis: Investigating Long-Term Operation Characteristics

Text abstract (~ ½ page or 300 words)	The application of alkaline water electrolysis (AWE) emerges as a promising avenue for economically viable, large-scale hydrogen production utilizing renewable energy sources [1]. Originally designed for stationary applications, AWE systems face the challenge of adapting to the dynamic and fluctuating nature of renewable energy inputs. To evaluate the impact of dynamic operation and power fluctuations on efficiency, comprehensive aging data for AWE systems is essential. Despite AWE being a mature technology, there is a lack of long-term data and a comprehensive understanding of aging [2]. This study investigates the start-up and aging behavior of AWE systems. A test cell featuring a 5 cm^2 active cell area and Nickel electrodes was operated both stationary and dynamically at potentials ranging from 1.6 V to 2.4 V over a total duration of 3000 h. Consistent comparisons were facilitated through the recording of polarization curves, impedance measurements, and gas purity measurements. Thorough analysis of start-up behavior and aging characteristics of the AWE system was conducted, and various methods for defining these characteristics were compared. The study highlights the dependency of start-up and aging on applied potential and operation mode. Furthermore, it indicates the need for standardized evaluation criteria. This research contributes to the comprehension of AWE responses during extended operation, proposing methodologies for determining start-up time and degradation rate while establishing evaluation standards for alkaline electrolysis systems. The findings also serve as crucial metrics for modeling the durability of alkaline power systems and formulating operation strategies for longevity. [1] Brauns, J.; Turek, T. (2020): Alkaline Water Electrolysis Powered by Renewable Energy: A Review. In: Processes 8 (2), p. 248. [2] Ehlers, Johan C.; Feidenhans'l, Anders A.; Therkildsen, Kasper T.; Larrazábal, Gastón O. (2023): Affordable Green Hydrogen from Alkaline Water Electrolysis: Key Research Needs from an Industrial Perspective. In: ACS Energy Lett. 8 (3), p. 1502–1509. The presented research is funded by the German Federal Ministry of Economic Affairs and Climate Action and the project "NextH2 - Next generation of powerful and efficient alkaline electrolyzers for regenerative H2 generation" (Reference 03EI3011A-C).