Archived Q&As | Panel Discussion during the webinar “Advancing online diagnostics and building durable electrolysis systems for Europe’s hydrogen future”

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Online via Zoom

These are written archive as reported from the Q&As chatbox. There are live answers of speakers at some point where you can find during the Panel Discussion in the full recording.

No.	Question	Answer
1	Have you stadardized with HTO measurements between the institutes?	In the case of DELYCIOUS we will use the Raman probes on-line to track gases cross-over
2	Hi! I've come across a recent ELECTROLIFE study showed strong performance of Pt-based catalysts under industrial conditions. What key lessons from this work can guide material selection and design for more durable and cost-effective solid oxide electrolysis systems in Europe?	In ELECTROLIFE (water/steam SOEL), the TU Graz–SolydEra team also probes CO_2 and co-electrolysis feeds to reflect industrial operation. The key lesson for Europe is that smart architecture can cut cost: a Pt honeycomb/structured catalyst keeps >98% CH_4 conversion even at high industrial GHSV, while Ni pellets become diffusion-limited and more sensitive—often implying bigger reactors or tighter controls. For stack durability, they show you should stay steam-rich (lower impedance), avoid CO-rich conditions that can passivate Ni, and treat front-end impurity cleanup (e.g., sulfur/halides) as a core durability measure. If you’re interested in further details, you can contact the corresponding author listed in the paper.
3	Can you give some details, how the EIS & Raman combination in Delycious would be applied for SOEL stacks?	Hydrogen crossover in SOEL is much less of an issue in SOC stacks compared to e.g. PEM electrolysis unless there are serious leaks in the stack. In a more general context of SOC, the Raman spectrometer is also capable of quantifying CO2 and CO, which is interesting for Co-Electrolysis applications but outside of the scope of DELYCIOUS.

3.1	(Follow up) Thanks, I assumed you use in-situ Raman to detected changes of the cells in the stacks, not the gas composition.	Hello Dominik, no we will use it to track gases composition, sorry for the misunderstanding. One of the key-objective of DELYCIOUS is to provide tools that are technologically agnostic and universal and scalable. Despite having an in-situ Raman probe shining on our cell will be fun from the numbers of info you can derive from, this would require a not indifferent re-design of stacks housing , not sure many OEM would be happy of :) we are more targeting a plug-and-play approach. I hope it clarifies.
4	What role does monitoring play in enabling predictive maintenance or reduced downtime for electrolyser?	Live answer (Please see the full recording)
5	If the experimentation is proven on single cells or small stacks, how does the modelling account for the effects of then having large stacks and the consequent heat that will not dissipate as readily?	From the ELECTROLIFE point of view, we treat thermal effects as a first-order scale-up risk, so we don't rely on "single-cell data" alone. We run dedicated protocols to quantify temperature stressors (gradients, transients, hot spots) and use those results to calibrate the electro-thermal degradation models first on single cells, then transfer and validate them on stacks. In parallel, our stack test benches are designed to control ΔT across the stack and enable near-isothermal operation, so we can separate intrinsic degradation from thermal-gradient-driven effects. When temperature inhomogeneities do appear at stack level, the models are used to predict where/ when degradation accelerates, and to recommend operating modes (e.g., setpoints and ramp strategies) that minimize thermal stress and therefore limit degradation. Thanks for your question. From DELYCIOUS side, we will test AEL > 100 kW in a test-rig at Fraunhofer IWES Hydrogen Lab Leuna, that test stacks up to 2 MW. The electrolyzer management system (EMS) (model-based) is demonstrated for this large scale. We have a thermal managment system in the test-rig but the thermal dynamics, which will be measured, are considered in the models, which are used for optimal operation point estimation.

6	Is there any interest to make the experimental dataset public (AST, Long term testing)?	Live answer (Please see the full recording)
7	What water quality suitable to be used in Electrolyzer as I'm from Arid Area limited freshwater water resources only seawater which required treatment which is costly will be extra cost in hydrogen production.	Hello, in the case of DELYCIOUS we will use very pure DI water (<0.5 uScm-1). There are nevertheless on-going studies of electrolyzers using sea-water in literature and also some european projects are tackling the topics. But we will not cover it in the course of DELYCIOUS.
8	What type of KPI used to evaluate the Electrolyzer?	In ELECTROLIFE we align our performance, durability, and cost assessments with the Clean Hydrogen JU SRIA KPIs and use them as the reference for reporting progress and guiding design/operation choices (https://www.clean-hydrogen.europa.eu/knowledge-management/strategy-map-and-key-performance-indicators/clean-hydrogen-ju-sria-key-performance-indicators-kpis_en)
9	How detailed should a manufacturer provide a data sheet, so that you can know what is in the black box, as to the materials and their interaction/ synergies?	Live answer (Please see the full recording)
10	Are you also testing/modelling at elevated pressures in either/both projects or just ambient pressures? If yes, how high are these elevated pressures? Thanks in advance.	Live answer (Please see the full recording)
11	How do your projects plan to translate research outputs into tools or guidance that industry partners can adopt? Thank you!	Live answer (Please see the full recording)
12	The system is nonlinear how is calculated the gain of servers for estimation?	Live answer (Please see the full recording)
13	Is there any use of AI in the loop?	Live answer (Please see the full recording)
14	At which scale will the 10.000h degradation test be performed? So single cell, stack, whole system? What is the rough range of total cell area? I think this will be one of the longest durations tested/reported yet, so very impressive goals!	Live answer (Please see the full recording)