

SolydEra 30kW SOE module for GreenHub

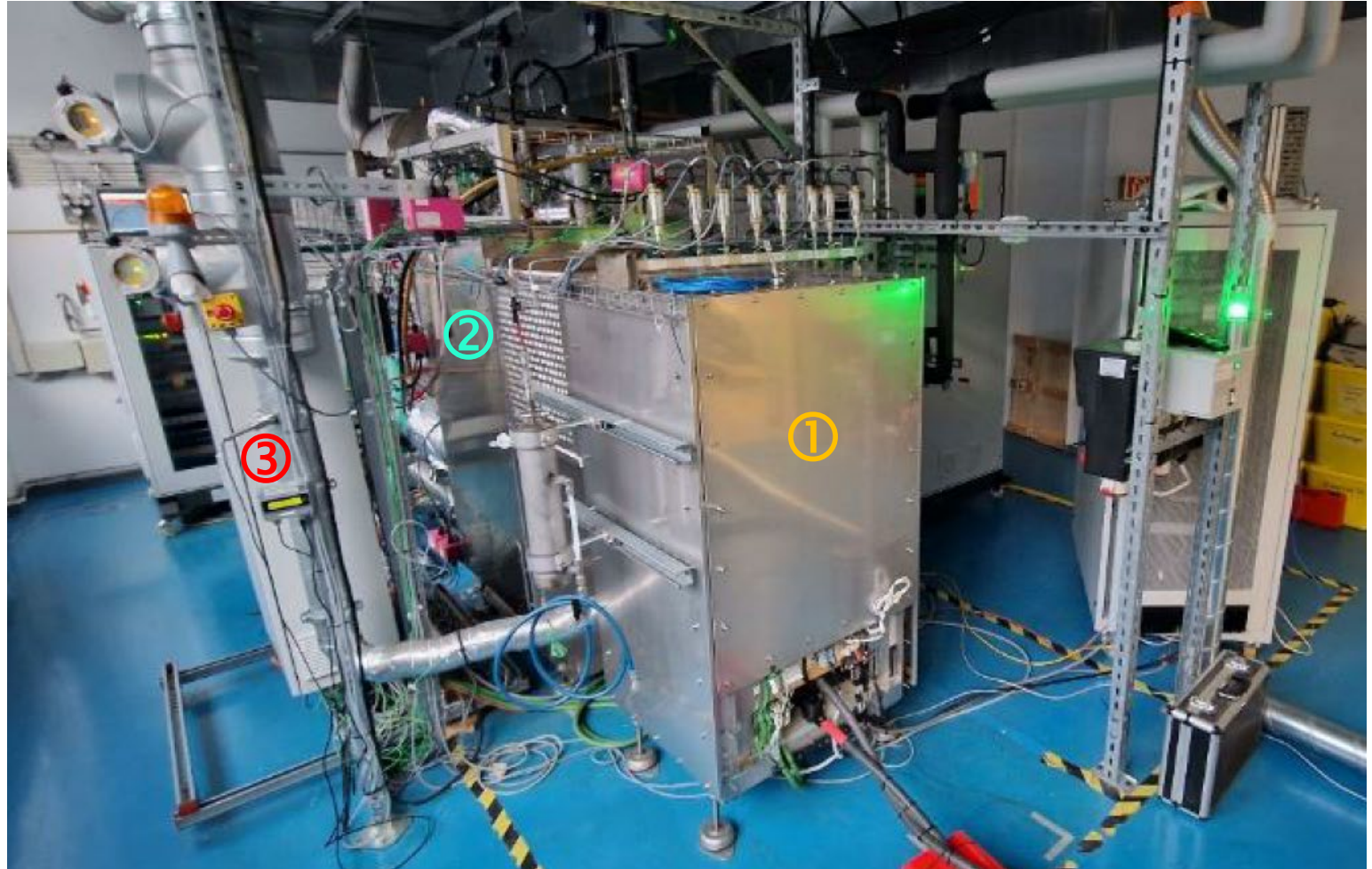
- **Single stack module** ①

- 100 layers large stack
- Gas manifolds
- Current collection
- Compression system
- Thermal insulation envelop
- Vent-line

- **Hot BoP module** ②

- HEX
- Electrical heater
- Off-gas routing
- Recirculation loop

- **PLC / SPLC** ③



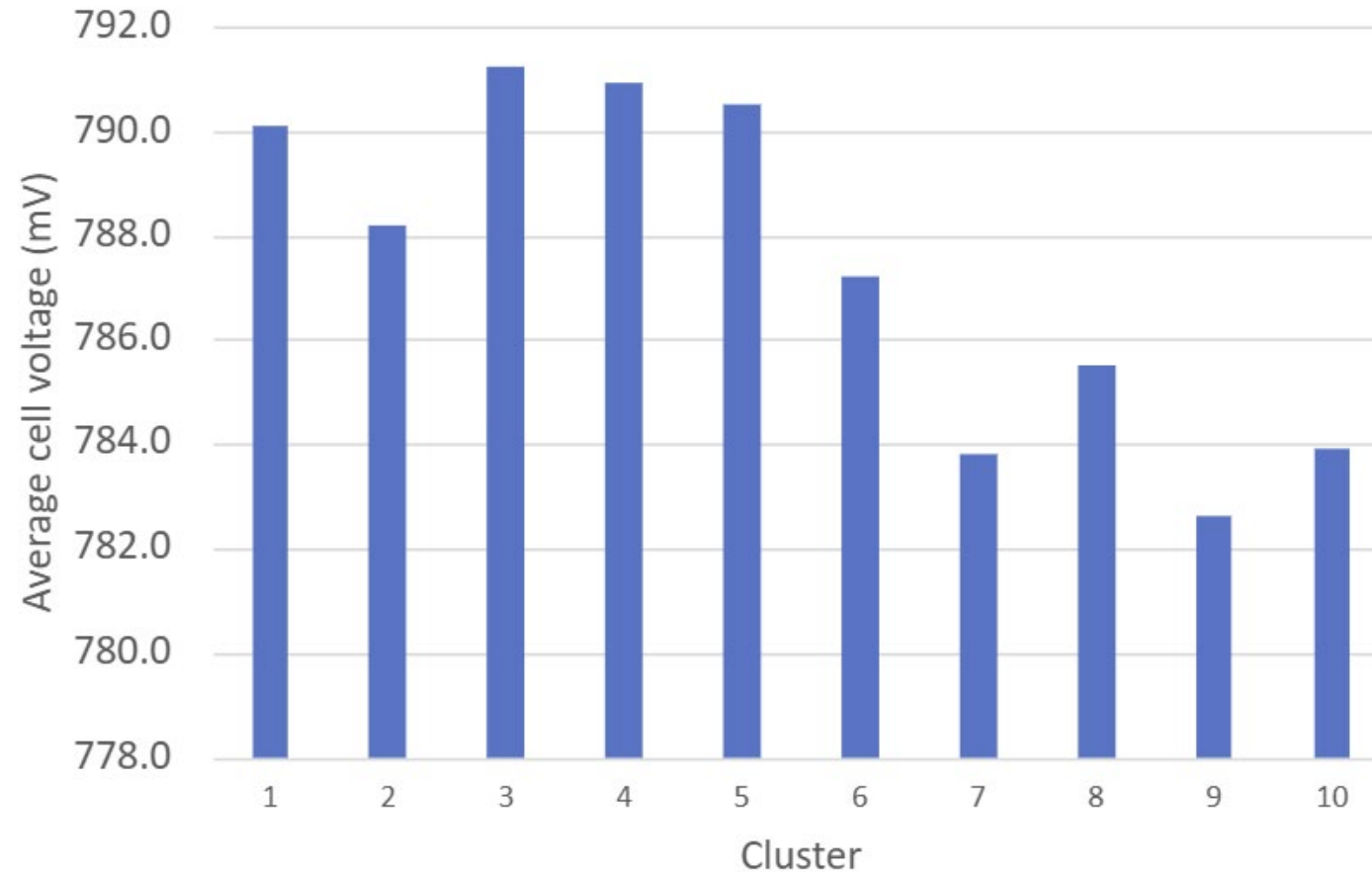
G8X-100 stack performance in large stack module

Power production with NG (Natural Gas)

- Fuel utilization: 84%
- Efficiency 64% (LHV)
- Steam-to-carbon 2.3
- Stack temperatures:
 - $T_{\text{air_in}} = 704^{\circ}\text{C}$
 - $T_{\text{air_out}} = 741^{\circ}\text{C}$
 - $T_{\text{fuel_in}} = 623^{\circ}\text{C}$
 - $T_{\text{fuel_out}} = 731^{\circ}\text{C}$
- NG : 28.8 l/min
- Steam: 3.4 kg/hr
- Air : 1500 l/min



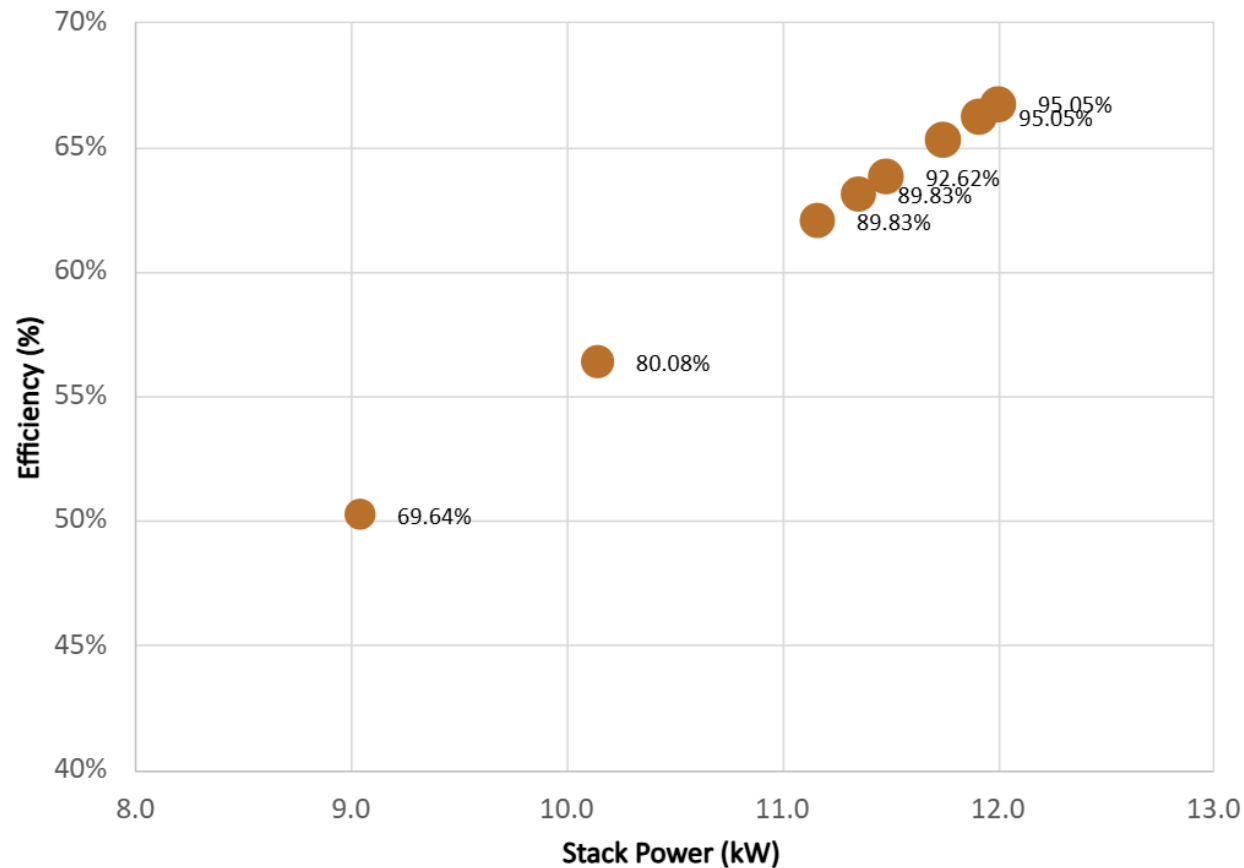
Voltage homogeneity at 84% Fuel Utilization (NG, no recirculation)



G8X-100 stack performance in large stack module

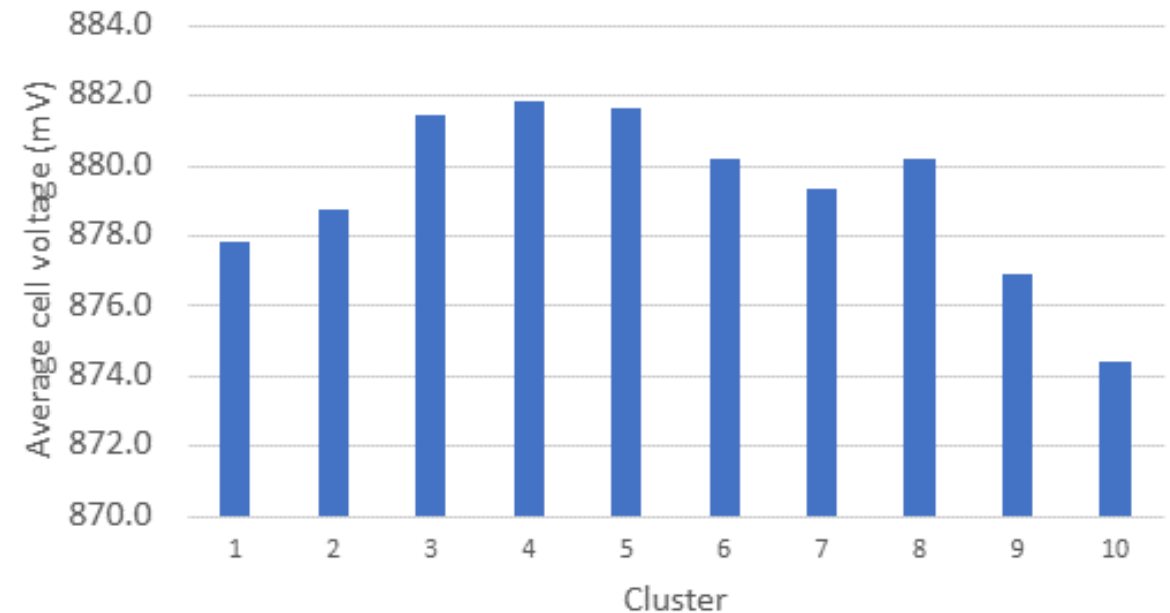
Stack efficiency VS Power for different fuel utilization

Stack Electrical Efficiency (LHV)- H₂



- SOFC 95 % FU
- Stack volage: 84.9 V @ 136.5 A
- Stack temperatures :
 - T_{air_in} = 693°C / T_{air_out} = 758°C
 - T_{Fuel_in} = 642°C / T_{Fuel_out} = 750°C
- H₂: 100 l/min
- Air : 2000 l/min
- Recirculation : 150 l/min estimated

Voltage homogeneity at 95% Fuel Utilization (with recirculation)



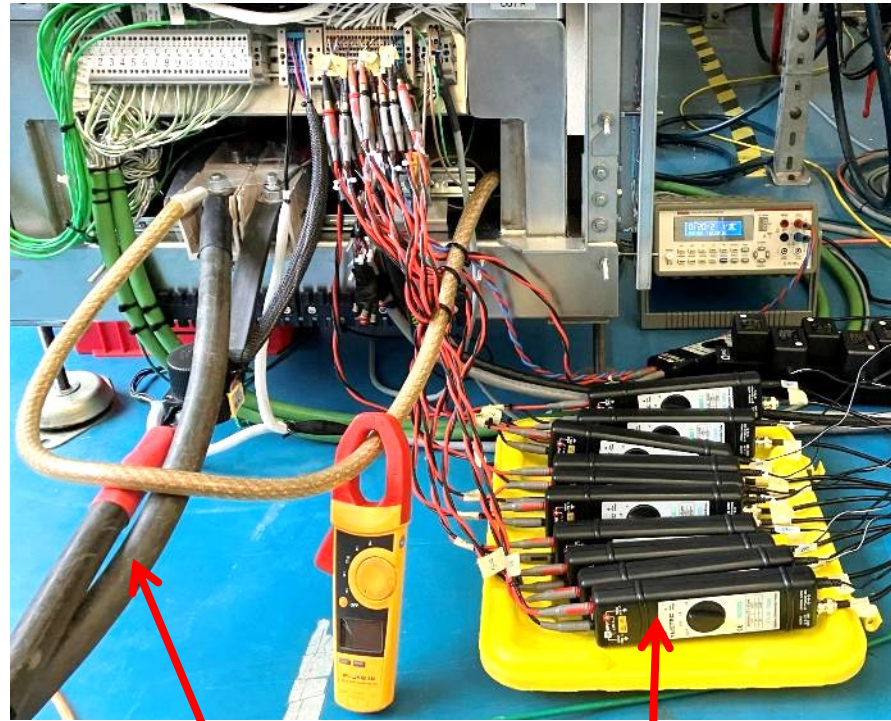
2nd Test campaign at SolydEra in February 2026



SolydEra LSM
Stack Module G8x10
100 Layers - 320 cm²
10 kWe / 30 kWe
Fuel Cell / Electrolysis



EPFL
- Electrochemical impedance spectroscopy device (EIS)
- DC Power Supply (36 kWe)



DC Cable 240mm²



Stack Current Probe

1x Stack Voltage Probe
10x Clusters Voltage Probes

- Security PLC
- DC Power Supply
- Computer
 - EIS Software
 - Power Supply Software
- UPS



EIS (Electrochemical impedance spectroscopy) data analysis

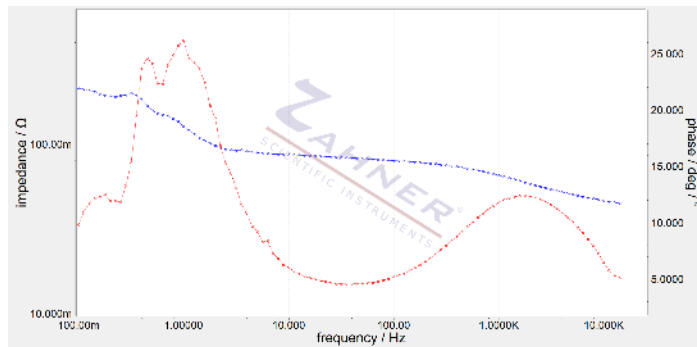
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RAW data measurement files



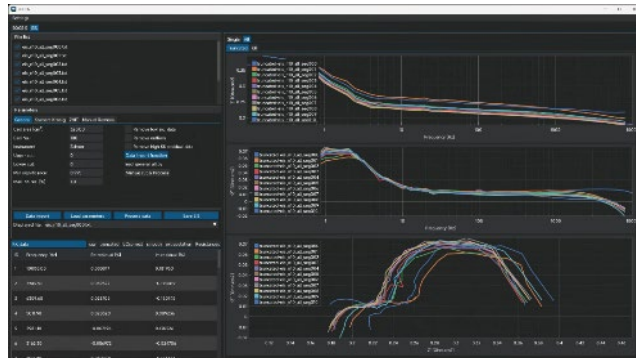
Frequency : 100mHz → 14 kHz
53 points per EIS measure
Voltage : 1x Stack + 10x Clusters
Current : 1x Stack

Bode



2

EPFL GEM : Software SOCEIS Dr. Hangyu

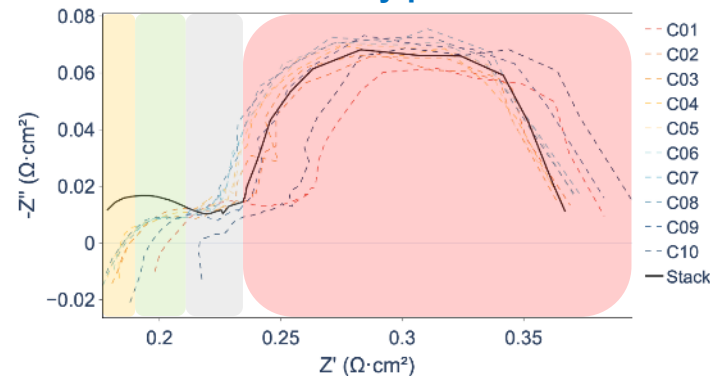


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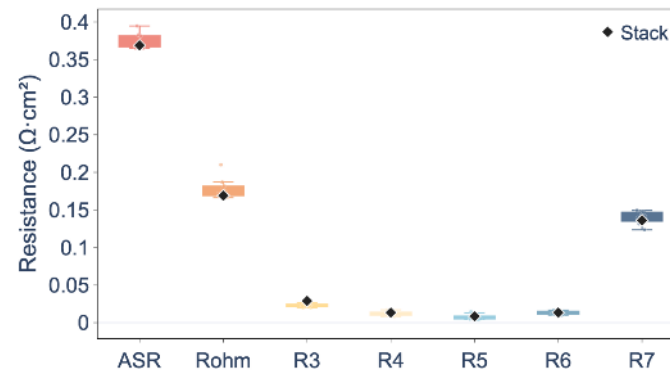
EIS measurements : SOFC full stack and 10 clusters

95% FU with H2 and anode off-gas recirculation

- Nyquist

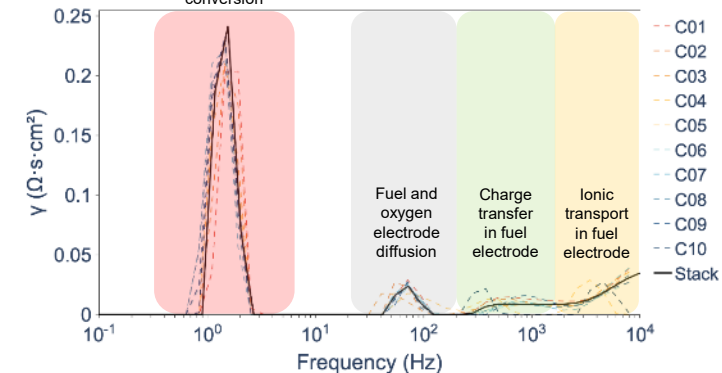


CNLS Fitting

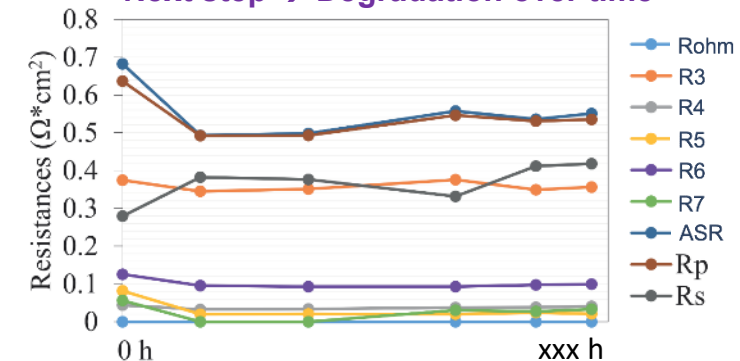


Gas diffusion in substrate & gas conversion

DRT

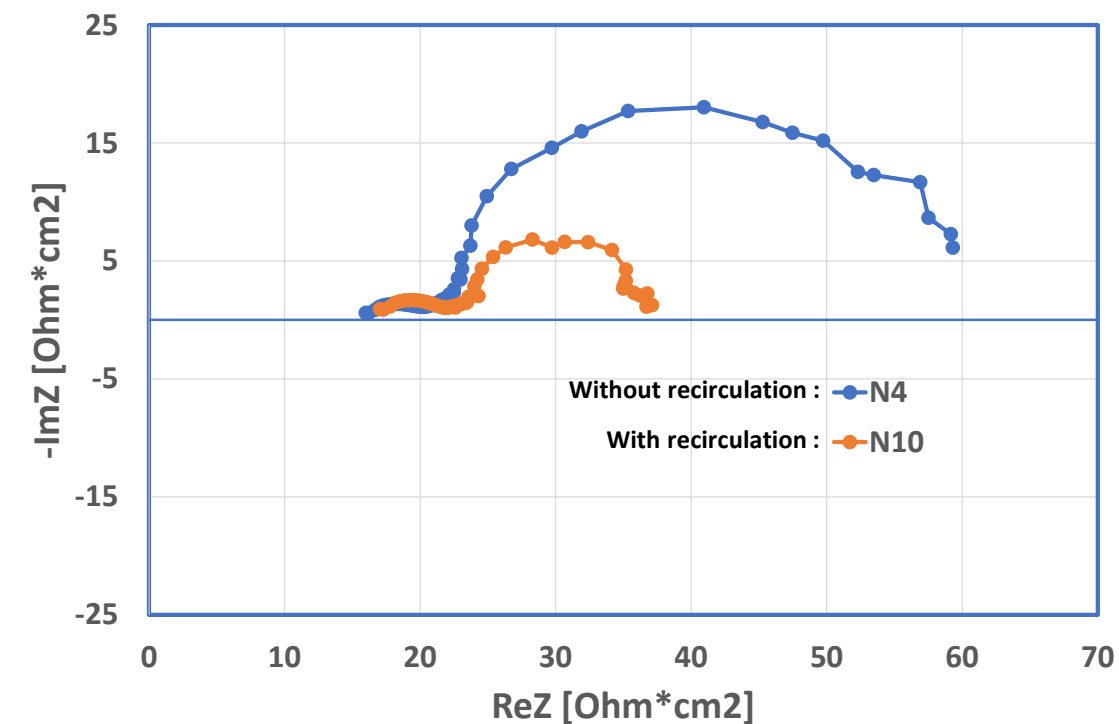


Next step → Degradation over time

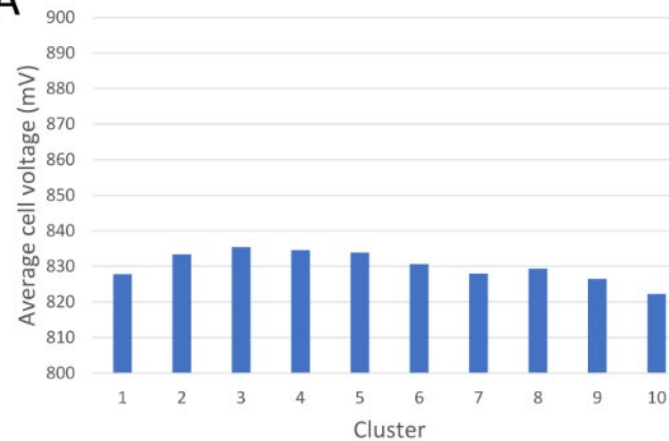


Effect of AOG recirculation on performance and homogeneity

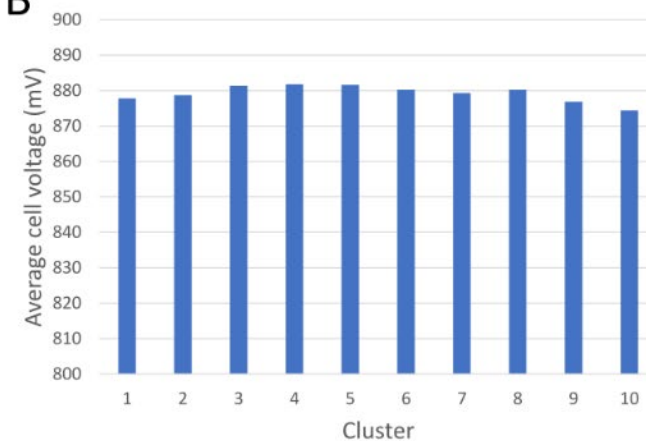
Electro-chemical internal losses in the stack



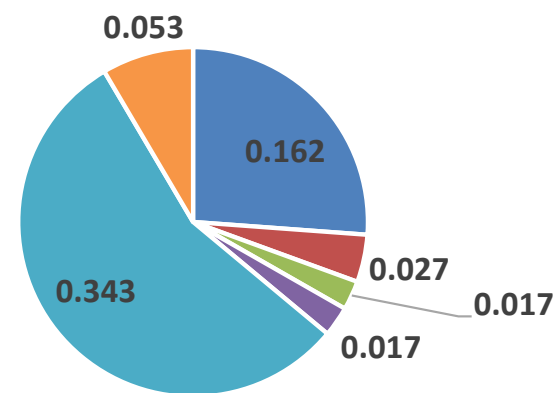
A Without recirculation



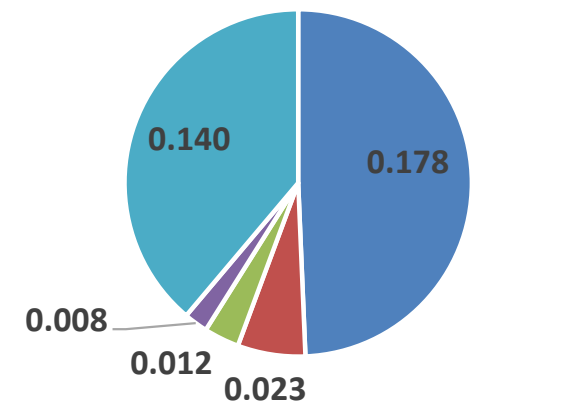
B With recirculation



N4



N10



■ Rohm ■ R3 ■ R4 ■ R5 ■ R6 ■ R7

■ Rohm ■ R3 ■ R4 ■ R5 ■ R6