Product development: Celtec®-Z Membrane and MEA

BASF Environmental Catalyst and Metal Solutions has developed a new, mechanically robust membrane by innovating the membrane production process.

- Cost competitive production process
- Mechanical robustness and creep compression
- Pressure operation and high performance
- Temperature and impact on performance
- Imbibing with different electrolytes

Celtec-Z membrane is still an experimental product which will be standardized and qualified in 2025. Celtec-Z is especially suited to high pressure and current operation, enabling a high performance under hydrogen/air conditions.

Preliminary specifications of Celtec-Z

Celtec-Z Membrane Properties*

Polymer composition (PBI)	10 ± 1 wt.-% polymer 180 ± 10 mg/cm^3 phosphoric acid 1150 ± 60 mg/cm^3 phosphoric acid 70 ± 5 % wt.-% acid
Proton conductivity@160 °C	>130 mS/cm
Thickness (µm) dry polymer film	30 ± 10 um
Thickness (µm) doped Celtec-Z membrane	120 ± 10 um
Tensile properties: Stress at break	> 4 MPa
Tensile properties: Elongation at break	> 200%

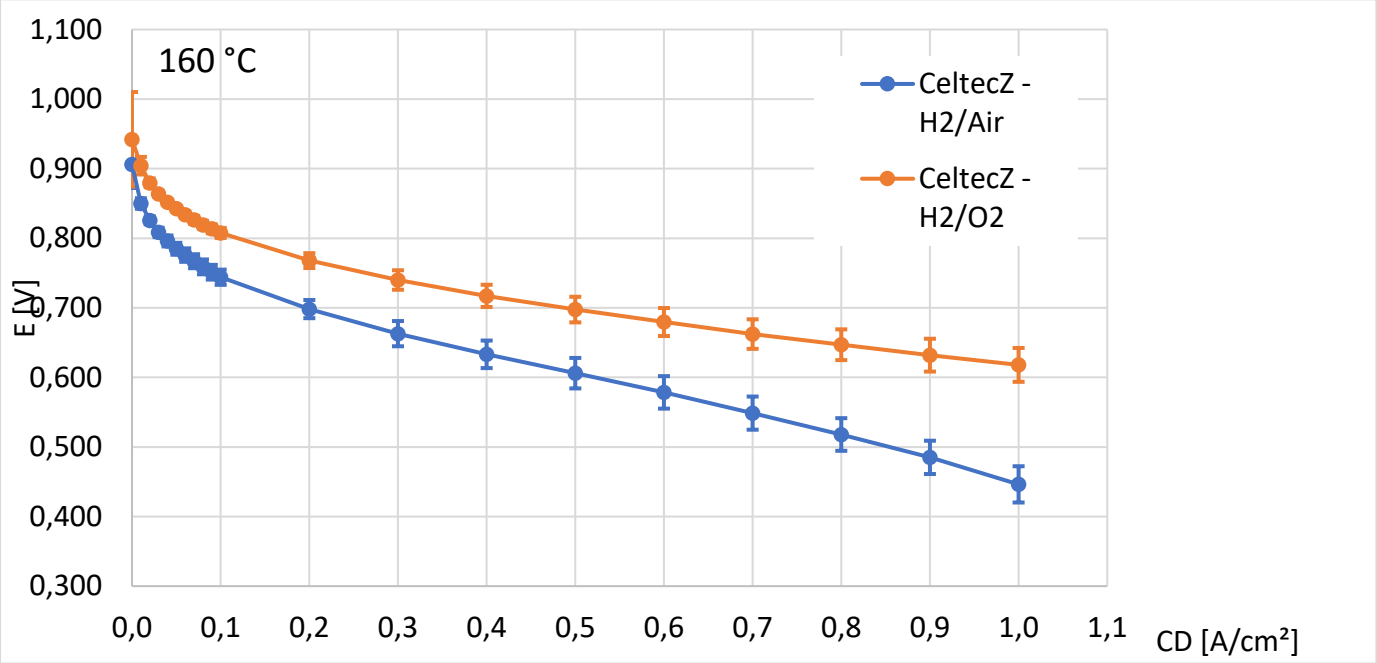
Celtec-Z MEA properties*

Membrane thickness in MEA (µm) after hot-pressing	~ 50 ± 10
X-over current (in mA/cm2 @ 0.5V/160°C)	~ 2,2
X-over current (in mA/cm2 @ 0.8V/160°C)	~ 3,8
Cell Resistance (mOhm@1kHz)	2,5

*(all values are preliminary values and are subject to change in final product)

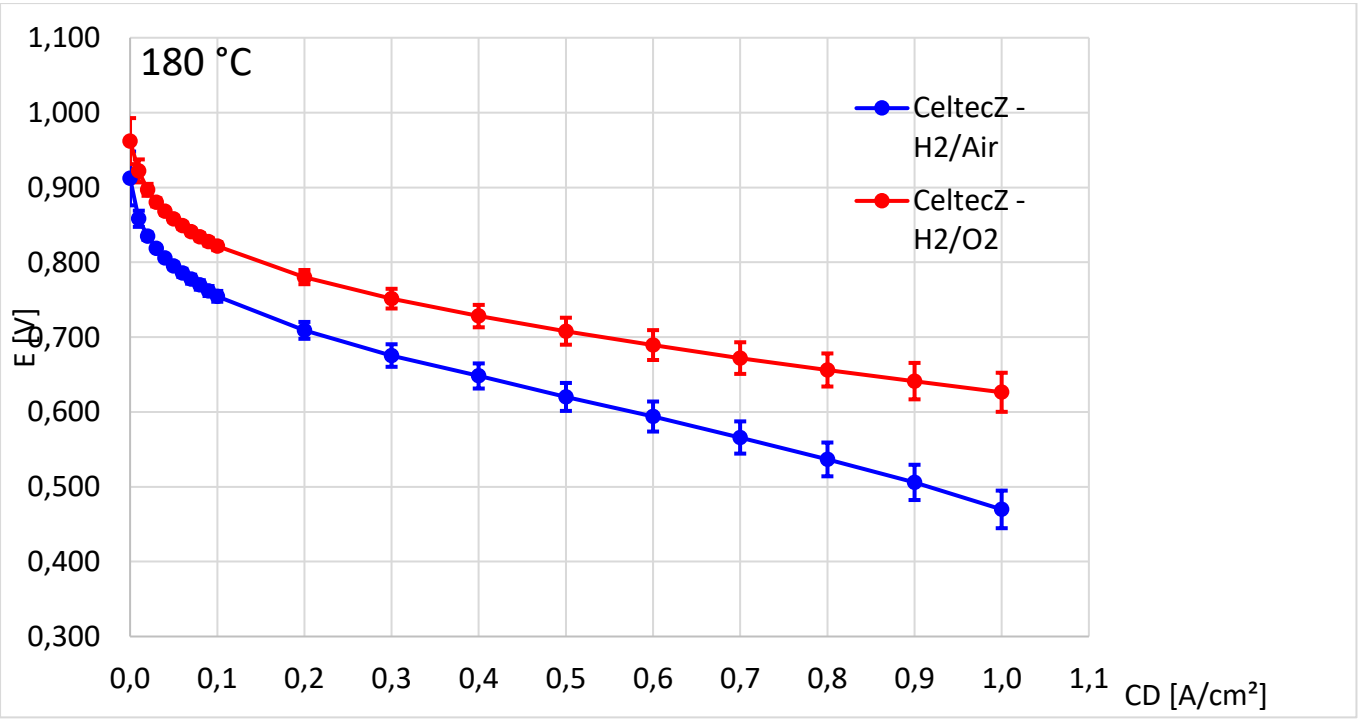
Celtec-Z MEA performance @ 160°C

OCP (H2/O2@160°C) > 970mV
OCP (H2/Air@160°C) > 910mV



Celtec-Z MEA performance @ 180°C

OCP (H2/O2@180°C) > 970mV
OCP (H2/Air@180°C) > 910mV



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