Supporting information

Comprehensive Investigation of Novel Pore-Graded Gas Diffusion Layers for High-Performance and Cost-Effective Proton Exchange Membrane Electrolyzers

P. Lettenmeier¹, S. Kolb¹, N. Sata¹, A. Fallisch², L. Zielke³, S. Thiele³, A. S. Gago*¹, K. A. Friedrich¹,⁴

¹Institute of Engineering Thermodynamics, German Aerospace Center, Pfaffenwaldring 38-40, Stuttgart, 70569, Germany

²Fraunhofer-Institut für Solare Energiesysteme ISE Heidenhofstrasse 2, Freiburg, 79110, Germany

³Laboratory for MEMS Applications, University of Freiburg, Georges Koehler Allee 103, 79110 Freiburg, Germany

⁴Institute for Energy Storage, University of Stuttgart, Keplerstraße 7, 70550, Stuttgart, Germany

*E-mail: aldo.gago@dlr.de
Figure S1. Schematic X-Ray CT cross-section images analysis of the 16S sample with local pore radii inscribed.
Figure S2. X-ray CT cross-section images of a) 16S, b) 16L+8S, c) 32S, d) 32L+8S and e) sintered Ti.
Figure S3. Mercury intrusion porosimetry characteristics up to 200 MPa of the PTLs: 16S, 32S, 16L+8S, 32L+8S and sintered Ti plate. The short bars on top of peaks correspond to the pore diameters (position in x-axis) calculated from the Gaussian fittings. In the case of the pore-graded PTLs, separate Gaussian fittings were used for the Ti45 and T125 regions.
Figure S4. Polarization curves of the 4 cm² active area 2-cell PEM electrolyzer with the GDLs: a) SAS mesh; b) sintered Ti; c) 16S; d) 16S + 8S; e) 32L+8S and f) 32S.
Figure S5. a-e) Drainage (blue) and imbibition (red) simulation results for the 5 investigated GDLs. The orange line is an optical guide for comparison and is located at 20 kPa. f) Bubble point and tortuosity.