

## **Supplementary information: Improving the performance of proton exchange membrane water electrolyzers with low Ir-loaded anodes by adding PEDOT:PSS as electrically conductive binder**

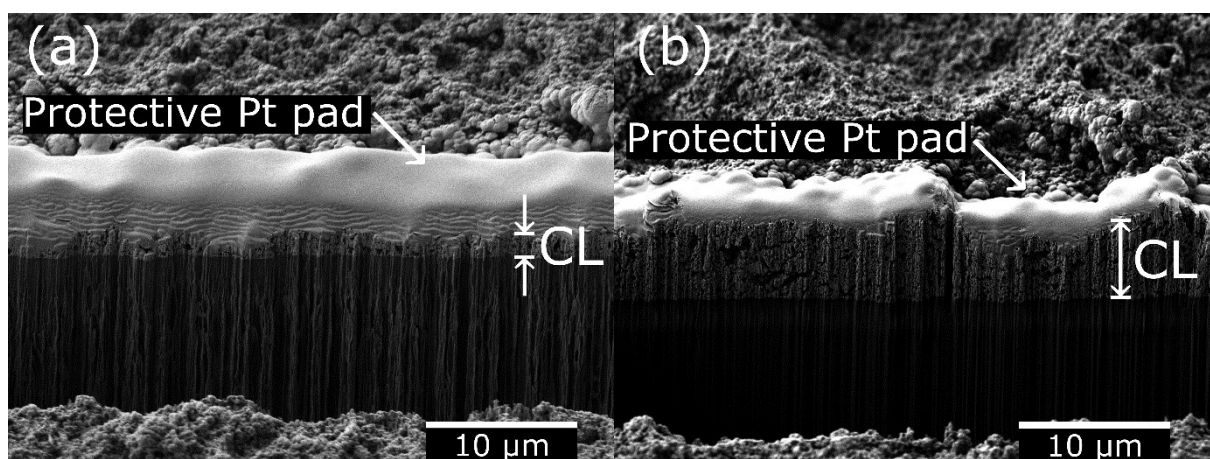
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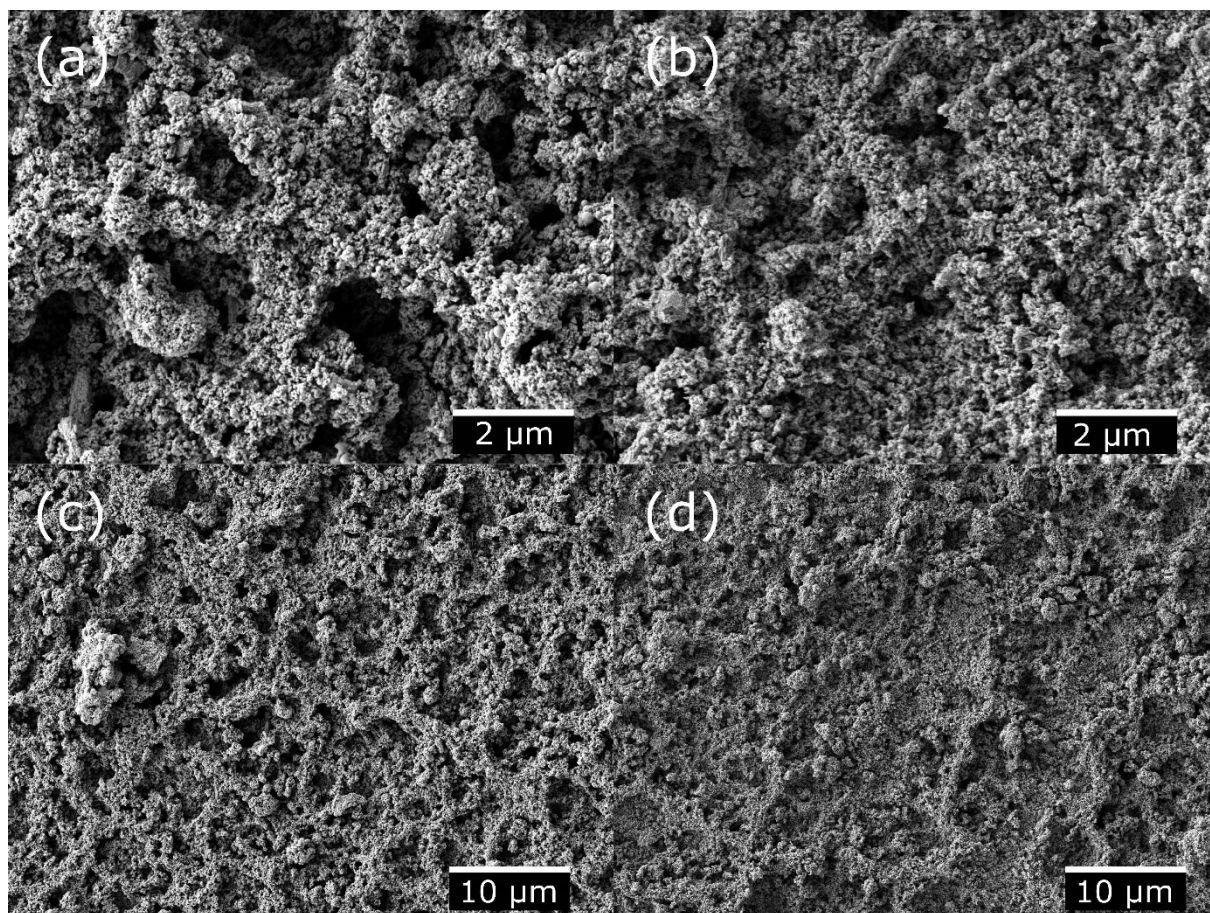
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**Figure S1** Cross-sections of two exemplary catalyst layers (CLs) with loadings of  $0.22 \text{ mg}_{\text{Ir}} \text{ cm}^{-2}$  (a) and  $0.78 \text{ mg}_{\text{Ir}} \text{ cm}^{-2}$  (b) and a binder content of 1 wt% PEDOT:PSS and 1 wt% Nafion. An average thickness of  $1.5 \text{ }\mu\text{m}$  and  $5.3 \text{ }\mu\text{m}$  was obtained by measuring the distance between the membrane and the edge of the CL for the low- and high-loaded CLs respectively. The cross-sections were produced via Focused Ion Beam (FIB) milling with an acceleration voltage of 30 kV and a current of 10 nA. A Pt layer was deposited on top of the substrate via FIB assisted chemical vapour deposition to protect the microstructure from the milling process. The SEM images were obtained using an Everhart-Thornley detector, with an acceleration voltage of 2 kV and a stage tilt of  $55^\circ$ .



**Figure S2** Top view of CLs with a catalyst loading of  $0.22 \text{ mg}_{\text{Ir}} \text{ cm}^{-2}$  but different ionomer contents; namely a 1:1 Nafion to PEDOT:PSS blend (a,c) and 2 wt% Nafion (b,d). Based on these images, no apparent changes in the CL could be found, which could explain the improvement in performance.