

Supplementary Information

Improvement in the efficiency of an Organometallic Fuel Cell by tuning the molecular architecture of the anode electrocatalyst and the nature of the carbon support

M. Bevilacqua ^a, C. Bianchini ^a, A. Marchionni ^a, J. Filippi ^a, A. Lavacchi ^a, H. Miller ^a, W. Oberhauser ^a, F. Vizza ^a, G. Granozzi ^b, L. Artiglia ^b, S. P. Annen ^c, F. Krumeich ^c, H. Grützmacher ^c

- 1) Morphological properties: Vulcan XC72 vs. Ketjenblack ED 600
- 2) XRPD: 2(OAc)@Ck vs 2(OAc)@Cv
- 3) XPS: C 1s scans before and after the galvanostatic cycle of 1(OTf)@Ck
- 4) References

1) Morphological properties: Vulcan XC72 vs Ketjenblack ED 600

Carbon black Type	Surface area (m ² /g)	Pore Volume (mL/100g)	Apparent Bulk density (kg/m ³)	XPS Oxygen/Carbon atomic ratio
Vulcan XC72	254	174	256	0.057
Ketjenblack EC 600JD	1400	480-510	100-120	0.066

Table S1. Summary of the main properties of Vulcan XC72 and Ketjenblack ED 600.

2) XRPD

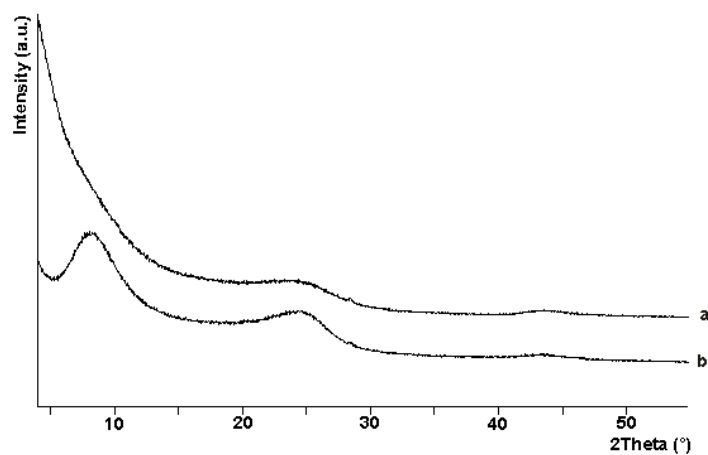


Fig. S1. XRPD spectra of 2(OAc)@Ck (a) and of 2(OAc)@Cv (b).

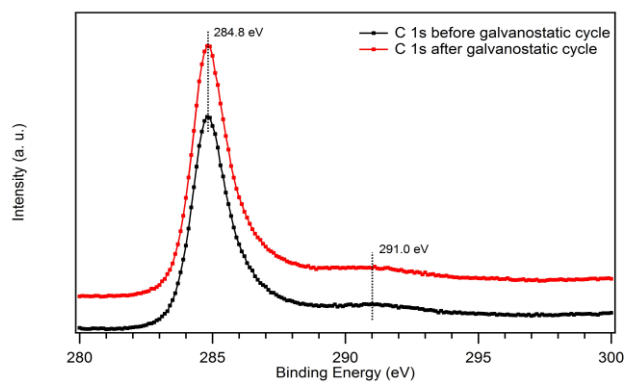


Fig. S2. C 1s scans (XPS), before and after the galvanostatic cycle of 1(OTf)@Ck, show two components, at 284.8 (Ck support) and 291.0 eV (C atoms bond to Rh, in an electron poor environment).

3) References

References concerning different carbon black properties: a) G. Wang, G. Sun, Q. Wang, S. Wang, J. Guo, Y. Gao, Q. Xin, *J. Power Sources* 2008, **180**, 176-180; b) T. Denaro, V. Baglio, M., Girolamo, V. Antonucci, A. S. Aricò, F. Matteucci, R. Ornelas, *J. Appl. Electrochem.*, 2009, **39**, 2173 – 2179.