

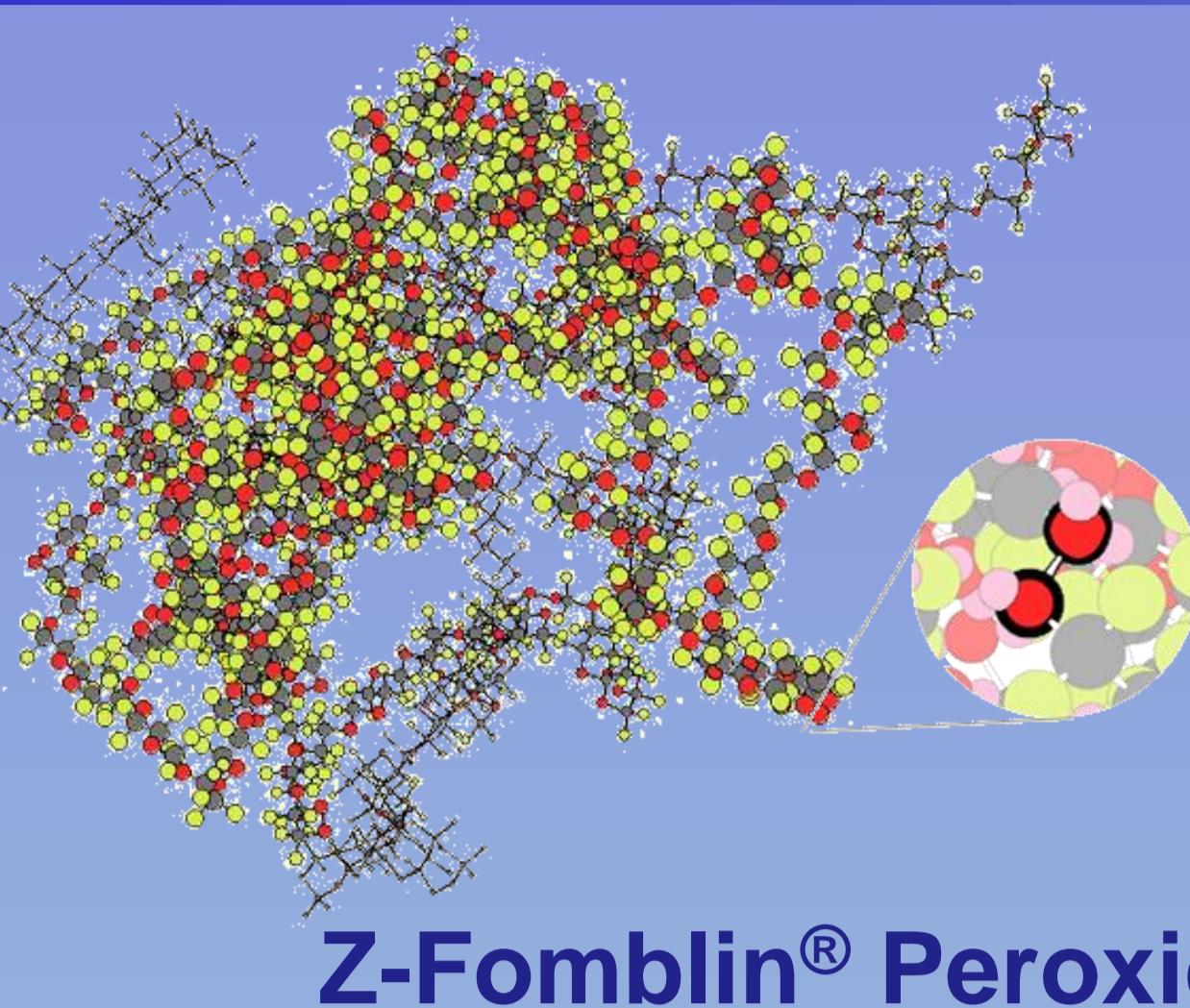


# SUPERHYDROPHOBIC PROPERTIES AND ELECTRICAL PERFORMANCES OF PFPE-MODIFIED CARBONACEOUS MATERIALS FOR PEM-FCs

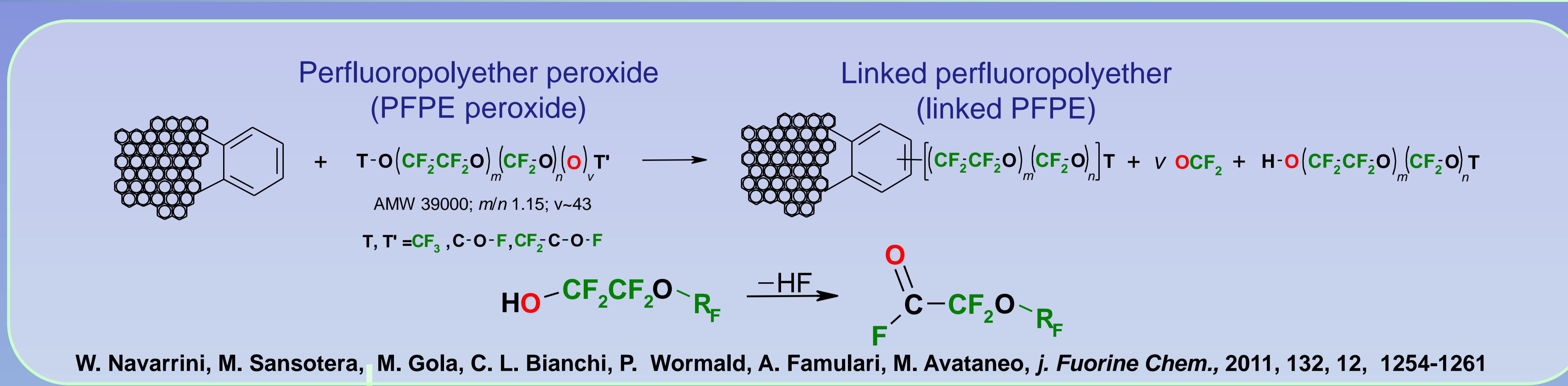
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Average Molecular Weight  
~39000 u  
 $C_2/C_1$  ratio  
1.15  
Peroxidic Oxygen  
1.33%<sub>wt</sub>  
Equivalent Weight  
~1200 u



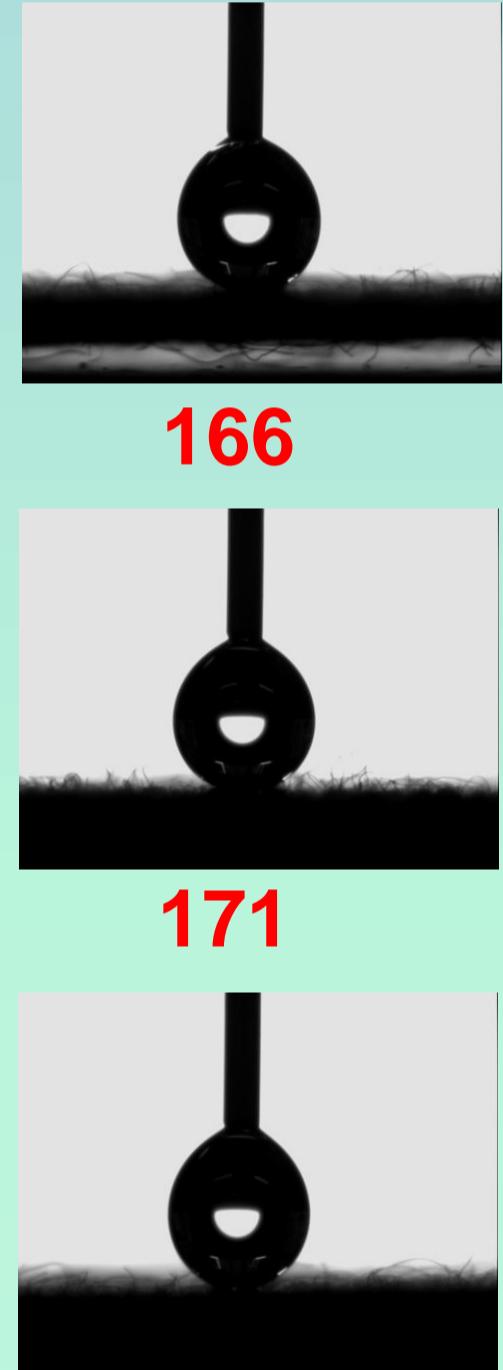
## CARBON CLOTH



## SEAL S5

### LINKED PFPE

0,24%<sub>wt</sub>



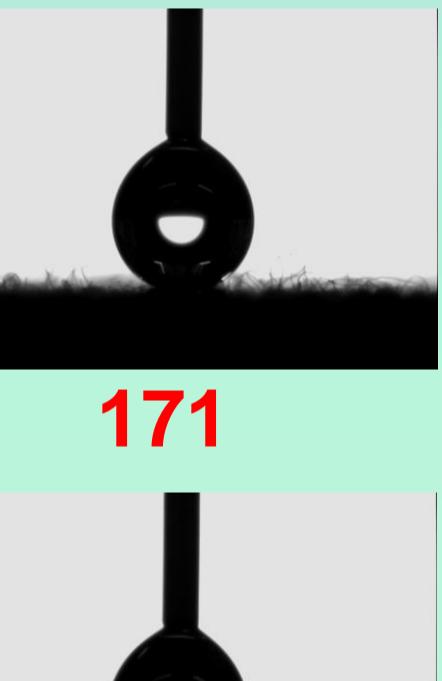
### %F<sub>at</sub>-XPS

38,3%



0,93%<sub>wt</sub>

44,2%

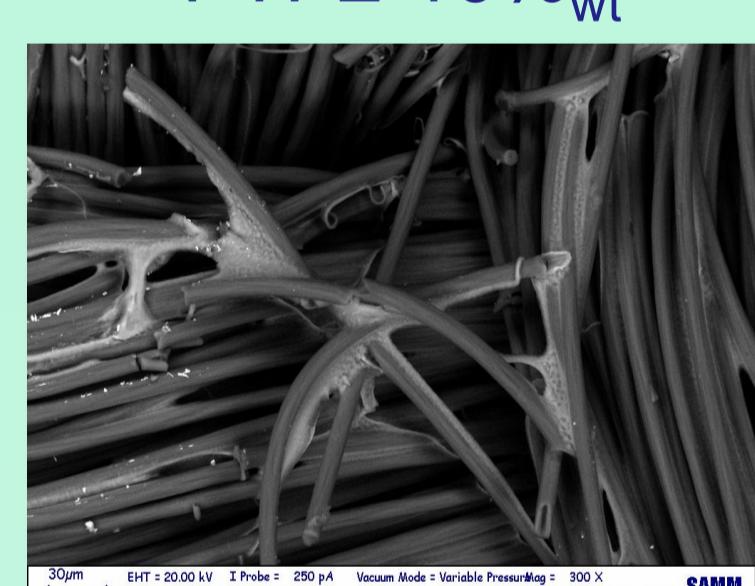


1,03%<sub>wt</sub>

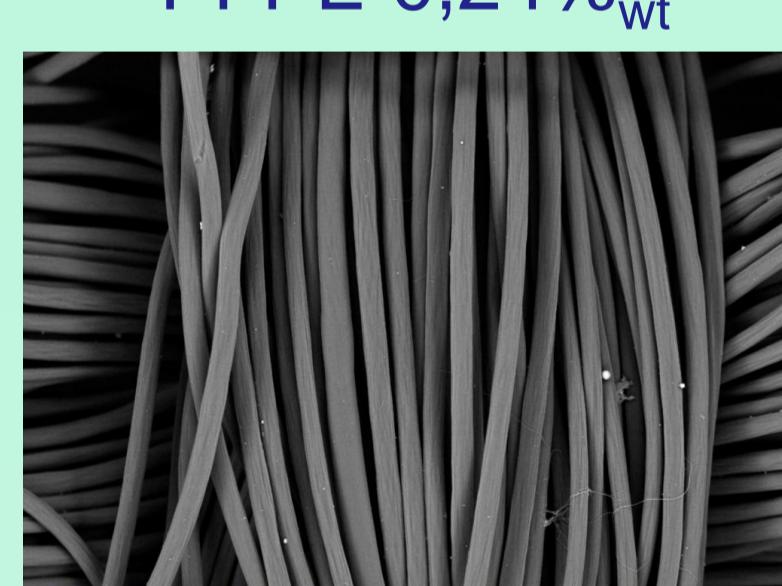
50,5%



### PTFE 10%<sub>wt</sub>

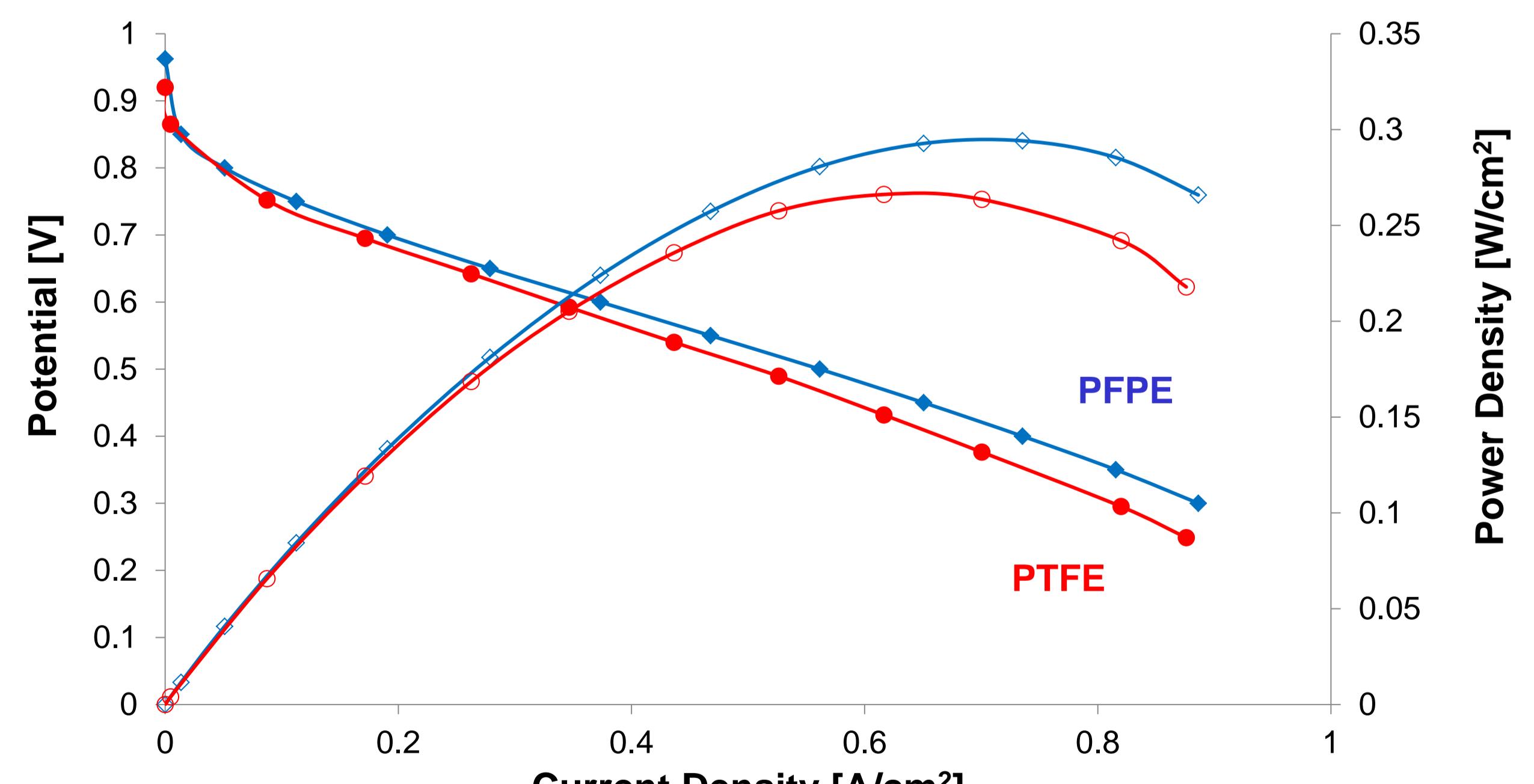


### PFPE 0,24%<sub>wt</sub>



## FUEL CELL TEST

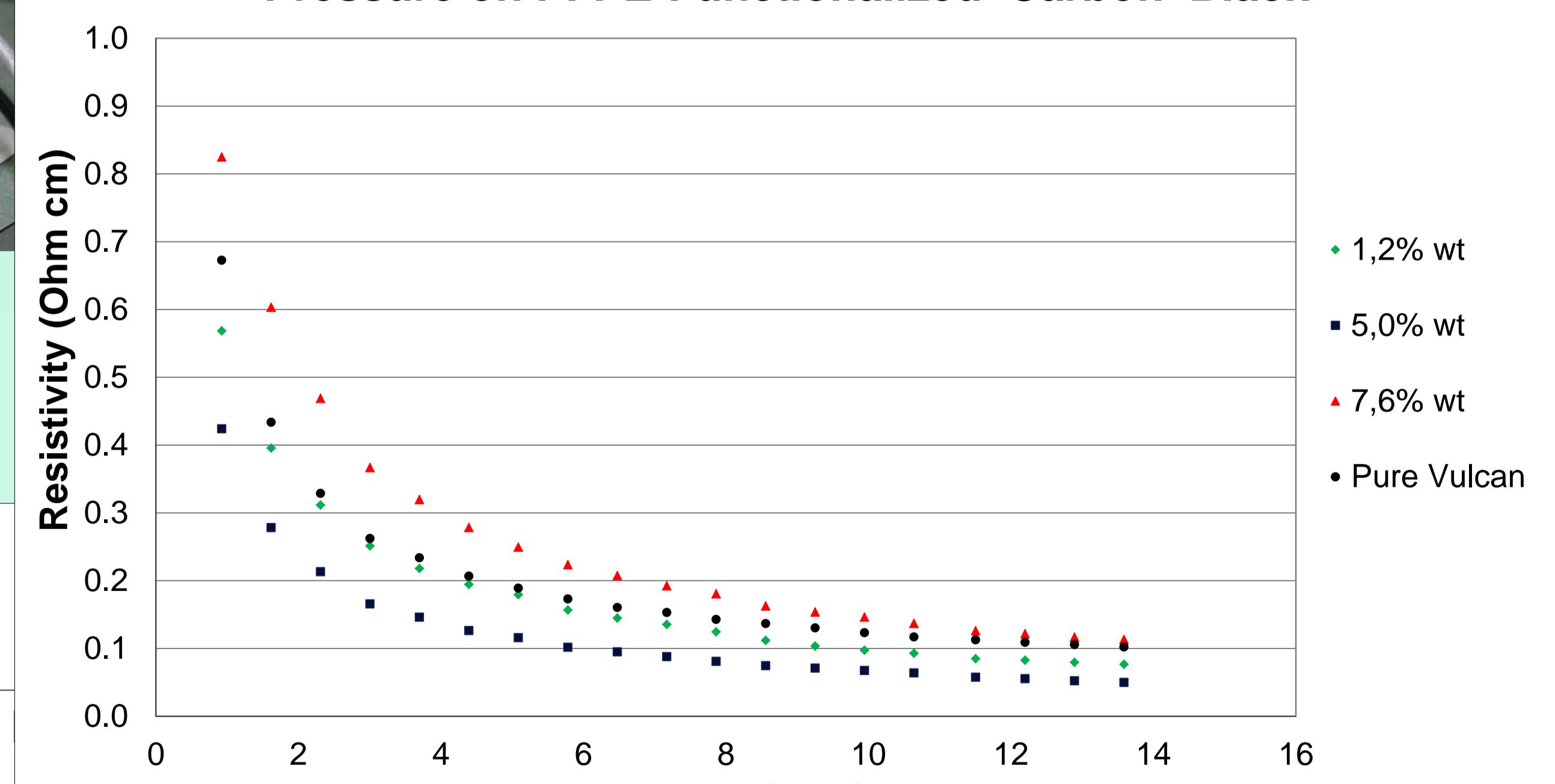
Comparison between PTFE 10%<sub>wt</sub> and PFPE 0,24%<sub>wt</sub> treated GDLs @80 °C and RH 80/100



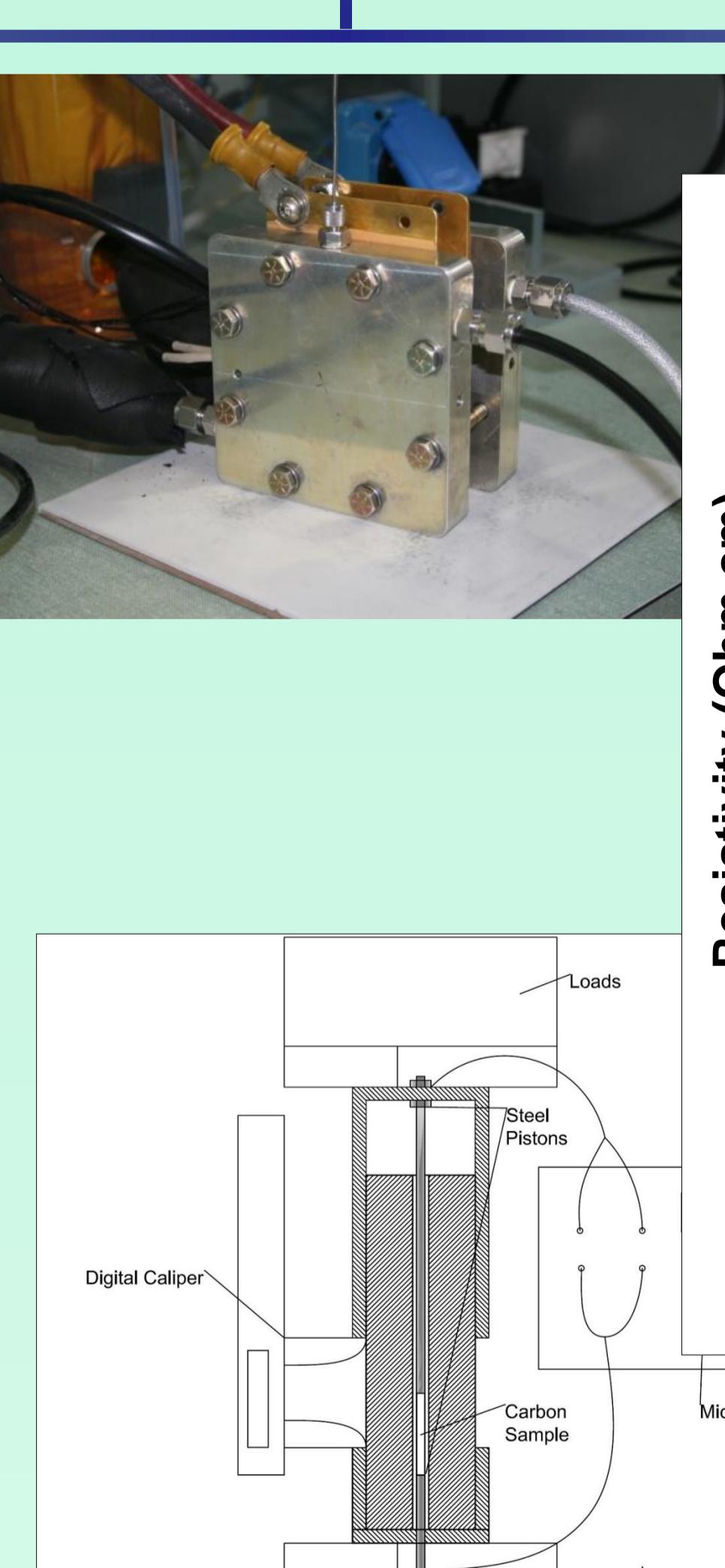
Maurizio Sansotera, Walter Navarrini, Massimo Gola, Giovanni Dotelli, Paola Gallo Stampino, Claudia L. Bianchi, *Int. J. Hydrogen Energy.*, 2012, 32, 7, 6277-6284

## RESISTIVITY TEST

Variation of Average Resistivity Changing Applied Pressure on PFPE-Functionalized Carbon Black



Maurizio Sansotera, Walter Navarrini, Giuseppe Resnati, Pierangelo Metrangolo, Antonino Famulari, Claudia L. Bianchi, P. Antonio Guarda Carbon, 2010, 48, 15, 4382-4390



## CONCLUSIONS

- Perfluoropolyether chains have been chemically linked on both carbon cloth and carbon black.
- The linkage of PFPE chains to carbonaceous substrates gives them high levels of hydrophobicity.
- The linkage of PFPE chains to carbonaceous materials does not compromise their electrical conductivity properties.
- Carbon cloth gas diffusion layers hydrophobized with PFPE show better performances respect to PTFE hydrophobized one even with a much lower amount of fluorinated polymer.

## ACKNOWLEDGMENTS

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