Supplementary Material (ESI) for Journal of Materials Chemistry


# Electronic Supplementary Information

# Chromium Nitride and Carbide Containing Fibers: from Composites to Mesostructures

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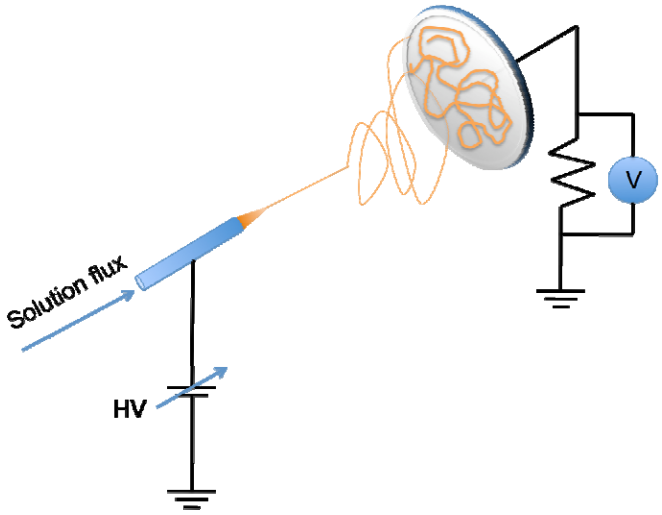


**Figure S1.** Schematization of the electrospinning device.

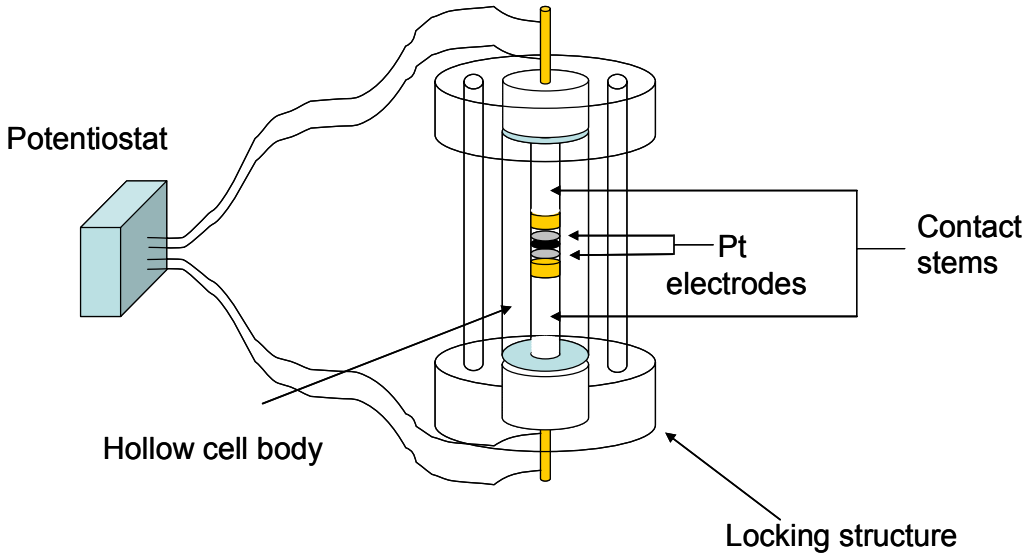


**Figure S2:** Schematic representation of the cell employed for resistivity measurements.

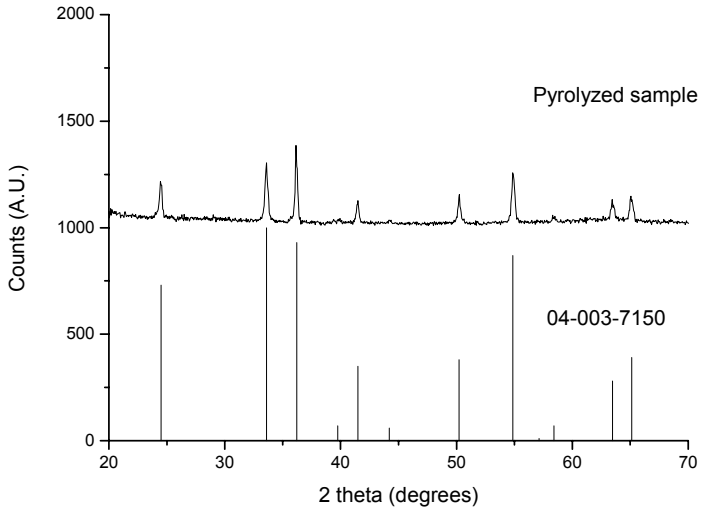


**Figure S3.** XRD Pattern of the pyrolyzed carbon composite fiber residue.

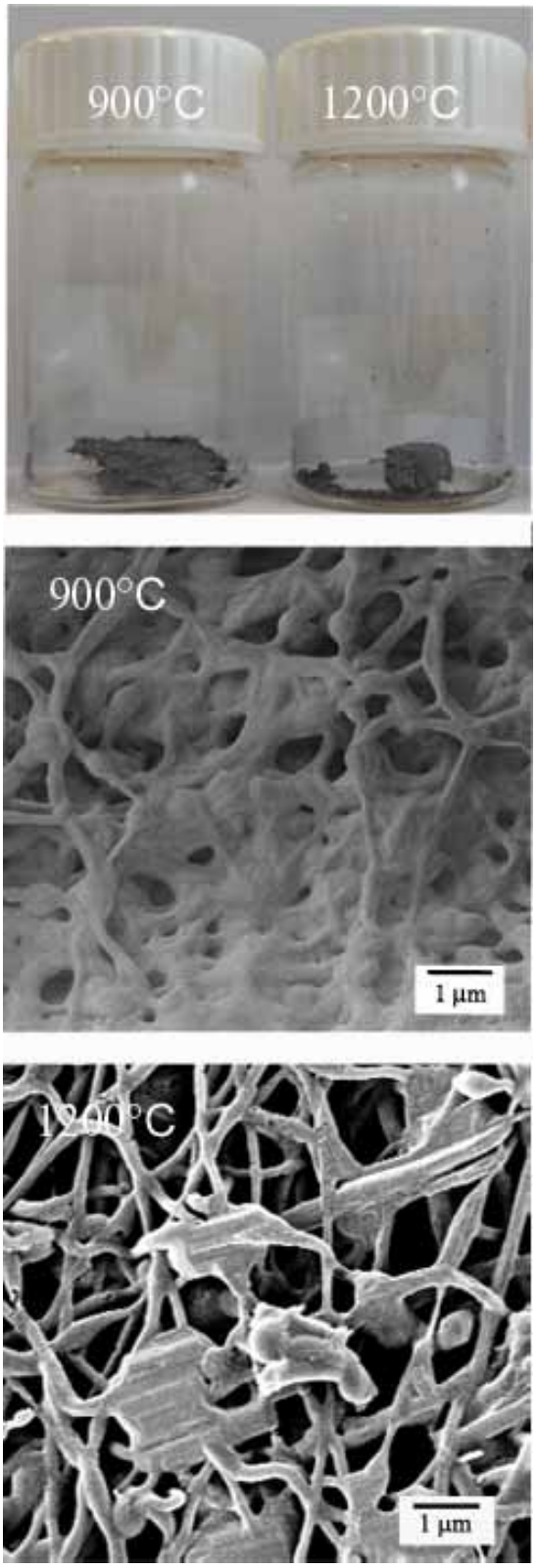


**Figure S4.** Images of samples calcined after brief exposition to high humidity conditions.

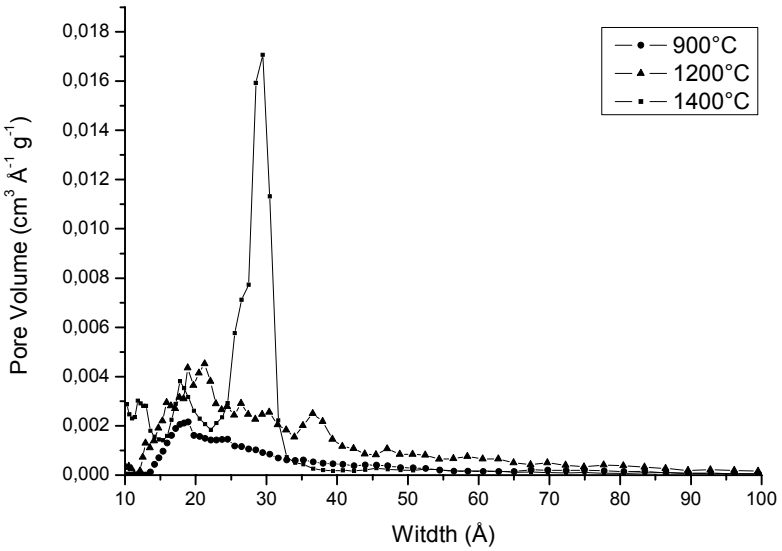


**Figure S5.** NLDFT plots of pore size distribution for PUF containing samples.

**Table S1.** Nitrogen sorption data from PUF containing fibers calcined at different temperatures: BET specific surface area (SSA) and pore size obtained from NLDFT.

| Temperature (°C) | SSA ($m^2$ $g^{-1}$) | Pore diameter (nm) |
|---|---|---|
| 800 | 25 | n.d. |
| 900 | 25 | n.d. |
| 1200 | 85 | 2.0-8.0 |
| 1400 | 110 | 3.0 |

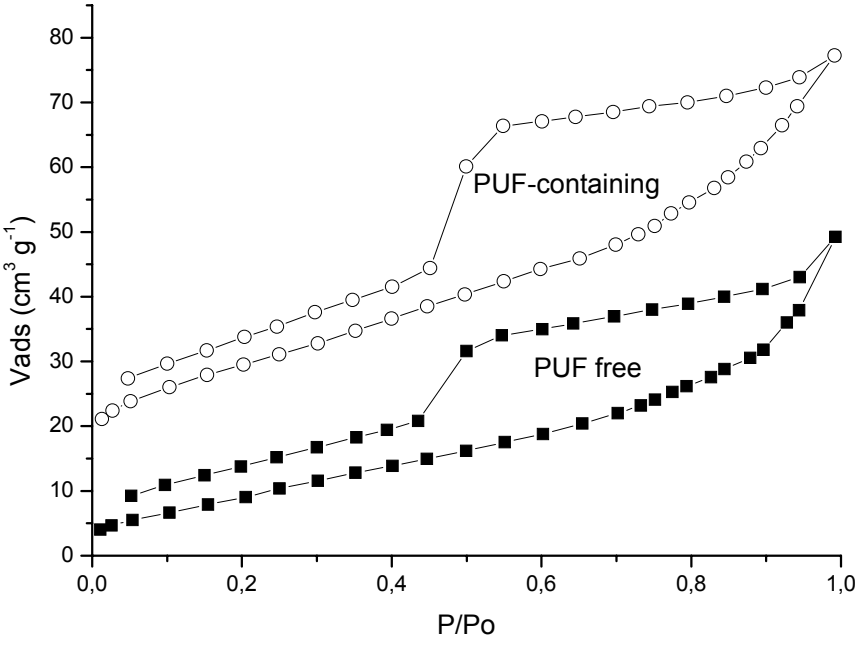


**Figure S6.** Nitrogen sorption isotherms of fibers calcined at 1400°C.

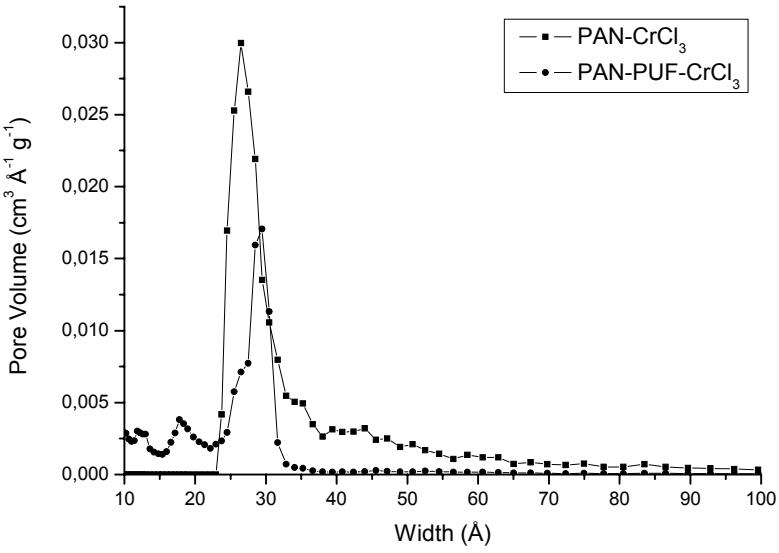


**Figure S7:** NLDFT Plots of the pore distributions from PAN-Cr and PAN-PUF-Cr at 1400°C.

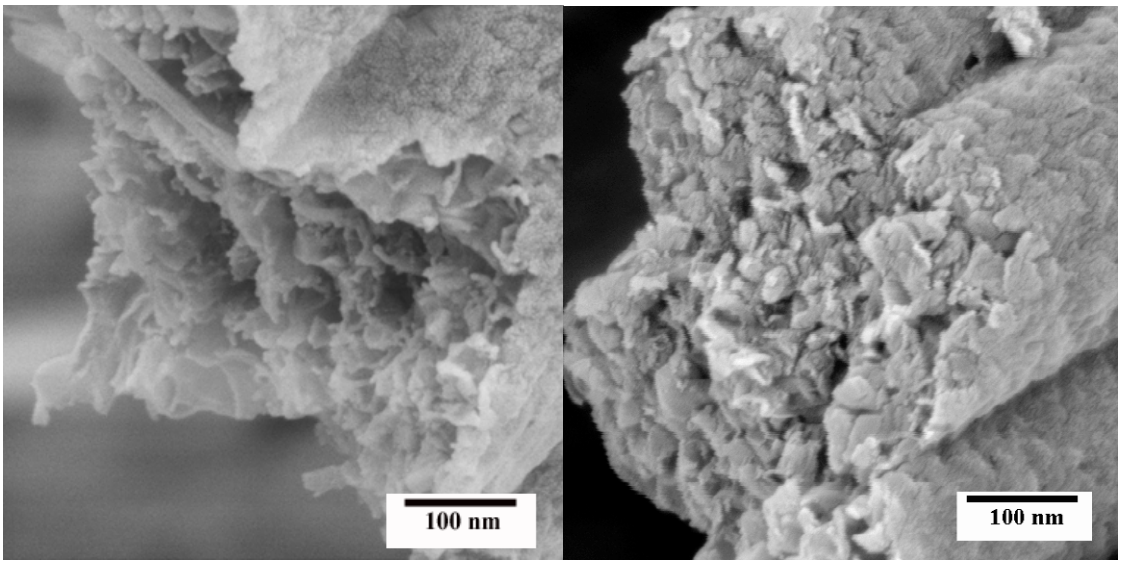


**Figure S8.** SEM images of the cross section of fibers treated at 1400°C after conductivity measurements.

**Table S2.** Resistivity of thermally treated fibers.

| Product | Resistivity (Ω·cm) |
|---|---|
| PAN-Cr @ 800°C | $5.82 \cdot 10^3$ |
| PAN-PUF-Cr @ 800°C | 1.71 |
| PAN-Cr @ 1400°C | 3.18 |
| PAN-PUF-Cr @ 1400°C | 2.77 |
| PAN-PUF@1400°C | 1.44 |
| PAN@1400°C | 0.43 |

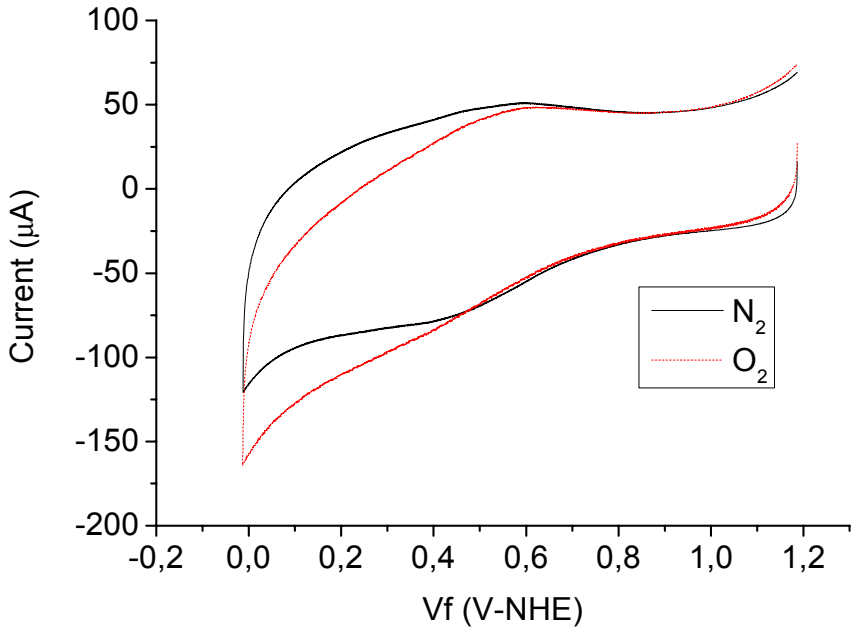


**Figure S9.** Cyclic voltammograms of the PUF containing composite in nitrogen saturated solution (black) and oxygen saturated solution (red).