SUPPORTING INFORMATION

Elaborating Ordered Silicon Carbide Nanorods by Preceramic Polymer Nanocasting

Thibaud Nardin, Julien Cambedouzou, Johann Ravaux, Cyrielle Rey, Daniel Meyer and Olivier Diat.

Use of the t-plot method of De Boer in determination of SSA assigned to the meso-porosity

Nitrogen physisorption measurements were performed using a ASAP 2020 at 77 K, after outgassing at 623 K during 8 hours, reaching a pressure below 1 mmHg, and specific surface areas were calculated using the BET method. N₂-isotherms were transformed into *t*-plots by converting relative pressures (p/p^0) into *t*-values via equation:

 $t = [0.1399 / (0.034 - \log(p/p^0))]^{0.5}$

where t [nm] is the thickness of the adsorbed multi-molecular layer and the ratio p/p^0 the relative pressure. The t-plots $V_{adsorbed} = f(t)$ are thus obtained.

In the particular case of a micro- and meso-porous material, this curve is a straight line at low relative pressure (before the capillary condensation related to the meso-pores). The slope s_t of this straight line is directly rely to the SSA assigned to meso-porosity (SSA^{meso}). Thereby, in the case of the adsorption of N₂ at 77 K, the SSA^{meso} is given by the equation:

$$SSA^{meso} = 0.0346 * s_t$$

<u>References:</u>

• Lippens, B. C. & de Boer, J. H. Studies on pore systems in catalysts: V. The t method. J. Catal. 4, 319-323 (1965).

• Voogd, P., Scholten, J. J. F. & van Bekkum, H. Use of the t-plot—De Boer method in pore volume determinations of ZSM-5 type zeolites. *Colloids Surf.* 55, 163–171 (1991).

• Kral, H., Rouquerol, J., Sing, K. S. W. & Unger, K. K. Characterization of Porous Solids. (Elsevier, 1988).

Chemical reaction equation

$$\label{eq:bis} \begin{split} Bis(cyclopentadienyl)-bis(diphenoxy)titanium synthesis: \\ (C_5H_5)_2TiCl_2 + 2PhOH + 2NaH \rightarrow (C_5H_5)_2Ti(OPh)_2 + 2NaCl + H_2 \end{split}$$

Hydrosilylation reaction

$$R_2SiH_2 + R'-CH=CH_2 \rightarrow R_2SiH-CH_2-CH_2-R'$$

Dehydrogenative coupling reaction

$$R_2SiH_2 + R'_2SiH_2 \rightarrow R_2SiH\text{-}SiHR'_2 + H_2$$



Figure S1 polymerisation of TSCH by dehydrogenative coupling catalyzed by Cp₂Ti(OPh)₂.



Figure S2 Wide-angle XRD patterns of pTSCH and pSMP10 after heat treatment at 1000 °C under inert atmosphere.



Figure S3 Nanocasting schematic representation with SMP10 and pTSCH.



Figure S4 SEM images of SiC-S2t.



Figure S5 SEM image of SiC-Sc with its schematic representation. The three domains are exhibited in this image: dense, meso- and micro-porous SiC.



Figure S6 TEM images of (a) SiC-S2t and (b) SiC-T2t.



Figure S6 TEM images of the nanorods network of (a) SiC-S2t and (b) SiC-T2t with greyscale profile obtained by integration of the red scare through the horizontal axis. (c) Schematic representation of the nanorods network with the expected greyscale profil. The centre-to-center distance *a* between the nanorods is respectively equal to 6.9 and 7.1 ± 0.5 nm for SiC-S2t and SiC-T2t.



Figure S7 Schematic representation of the 2D-hexagonal lattice of (a) a SBA-15 and of (b) its SiC inverse replica. The grey regions represent respectively the SiO₂ and the SiC. The porous network appears in white.