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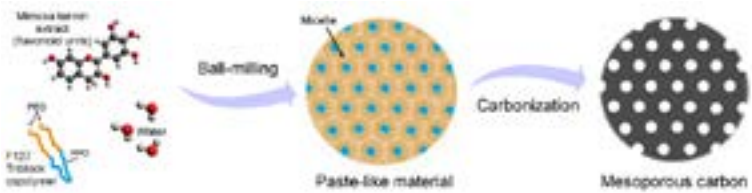
## Green synthesis of mesoporous carbons from tannins

An easy and one-pot synthesis method to produce mesoporous carbons through ball-milling will be presented. The method is also environment-friendly, due to the use of a natural and renewable carbon precursor, tannin, and to the absence of toxic or hazardous substances during the synthesis. These mesoporous carbons were prepared by mixing tannin (T), Pluronic® F127 (P) and water (W) without using any crosslinker. The effect of key parameters such as milling time, pH of added water and P: W weight ratio was studied. After carbonization at 900°C of the paste-like materials recovered from milling, the resultant carbon materials had an initial BET area of ~600 $m^2$ $g^{-1}$. Depending on the P:W ratio, they were perfectly ordered (OMC), with a 2D hexagonal geometry, or disordered (DMC). The mesoporous order proved to be thermally stable under inert atmosphere up to 1500 °C while, upon activation the BET area increased up to ~1900 $m^2$ $g^{-1}$. $CO_2$ activation on selected OMCs and DMCs allowed improving the textural properties, i.e., surface area, micro and mesoporous volume and pore connectivity. $CO_2$ activation was more effective on DMCs as shorter activation times were needed. The easier development of textural properties in the case of DMCs might be due to the higher residence time of $CO_2$ in the particle since the carbon texture, determined by Raman, and the heteroatoms content on the surface were identical. These materials should find relevant applications in environmental remediation strategies for oil spills, in selective $CO_2$ adsorption from humid gases or as electrodes of supercapacitors using aqueous or organic electrolytes, among others. Some of them will be presented.




### Biography

Vanessa Fierro pursued doctoral researches at the Institute of Carbochemistry (ICB-CSIC) and obtained her PhD from Zaragoza University, Spain. After working several years as a researcher at French Institute of Petroleum, at the Institute of Research on Catalysis and the Environment of Lyon (France) then at the Chemical Engineering School of Tarragona (Spain), she is a CNRS Research Director as well as a member of the Technical Group Coal 2 of the Research Fund for Coal and Steel (RFCS). She currently works at Institut Jean Lamour (France), a joint University of Lorraine-CNRS laboratory, where she leads the Bio-sourced Materials Research Team. Vanessa has more than 250 scientific publications, an h-index of 48 and an extensive background in the area of porous carbon materials for energy and environmental applications.

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