Electronic supplementary information

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Bio-oil: a versatile precursor to produce carbon nanostructures in liquid phase under mild conditions

Fabiane Carvalho Ballotin[a], Lucas Theodoro Perdigão[a], Marcus Vinícius B. Rezende[a], Sugandha Dogra Pandey [a], Márcio José da Silva[b], Ricardo Reis Soares [c], Jair Carlos Checon de Freitas[d], Ana Paula de Carvalho Teixeira[a], Rochel Montero Lago[a]*

[a]Federal University of Minas Gerais (UFMG), Exact Science Institute, Chemistry Department, Belo Horizonte/ MG, 31270-901, Brazil.
[b]Federal University of Viçosa (UFV), Chemistry Department, Viçosa/MG, 36570-000, Brazil.
[c]Federal University of Uberlândia (UFU), Chemistry Engineer Department, 38408-102, Uberlândia, MG, Brazil.
[d]Laboratory of Carbon and Ceramic Materials, Department of Physics, Federal University of Espírito Santo, (UFES), 29075-910, Vitória, ES, Brazil.

*Corresponding author
R. M. Lago, E-mail: rochel@ufmg.br

Table S1. CG/MS results for the organic phase (DCM) of the bio-oil sample

Compounds	Area / %
Carbohydrates and derivates	15
Phenols	17
Furans	4
Guaiacols	30
Syringols	50
Hydrocarbons	0,5

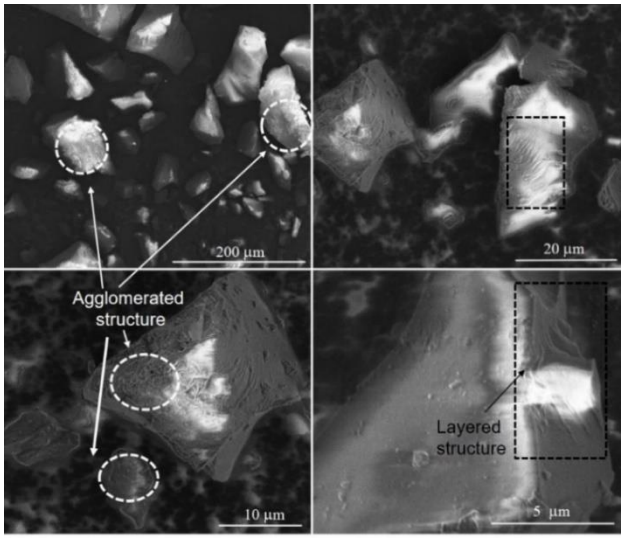

Fig S1. SEM images obtained for the product of the bio-oil reaction with H_2SO_4 ($BS_{1.8}$) at 120 °C.

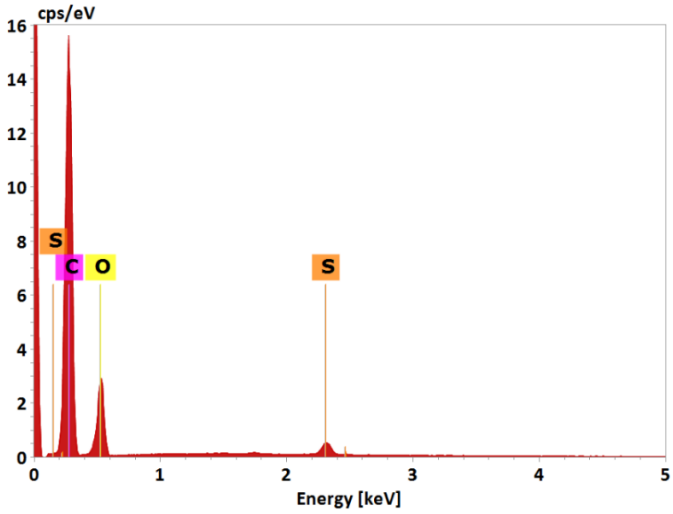

Fig S2. Energy dispersive X-ray spectrum obtained for the product of the bio-oil reaction with H_2SO_4 ($BS_{1.8}$) at 120 °C.

Table S2. Elemental analyses of materials $BS_{1.8}$ $BS_{3.7}$, $BS_{9.2}$ and $BS_{18.4}$

Materials	% C	% H	% S
Bio-oil	45.5	6.6	
$BS_{1.8}$	60.1	5.3	2.0
$BS_{3.7}$	55.0	4.1	2.8
$BS_{9.2}$	52.3	4.0	3.5
$BS_{18.4}$	49.2	3.6	4.3

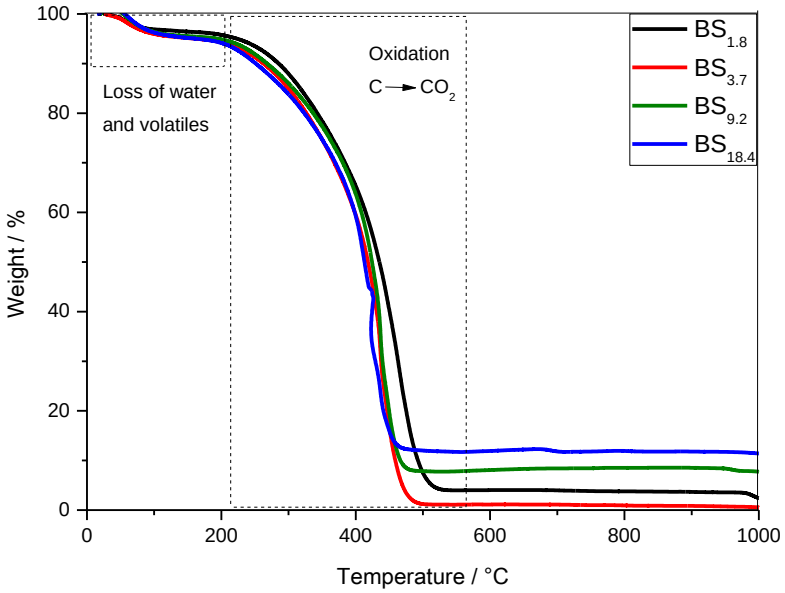

Fig S3. TG curves of materials $BS_{1.8}$, $BS_{3.7}$, $BS_{9.2}$ and $BS_{18.4}$, recorded under air flow.

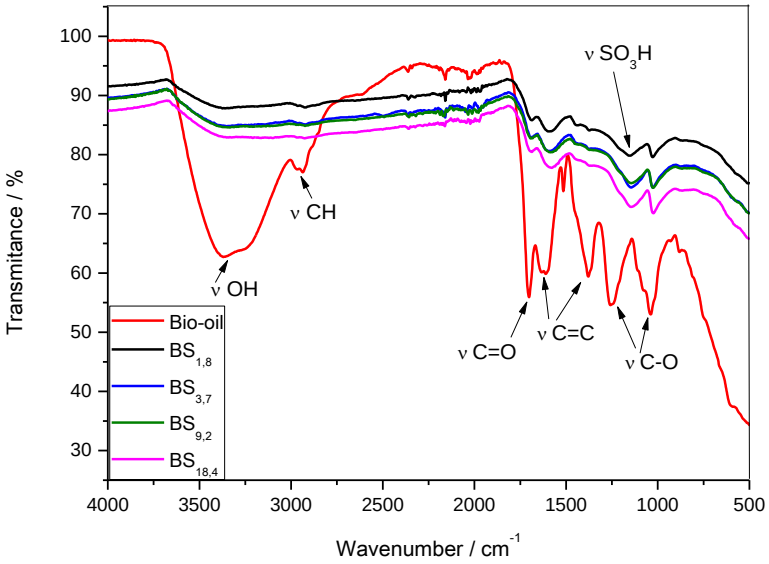

Fig S4. Infrared spectrum of bio-oil before and after sulfonation with different H_2SO_4:bio-oil ratio at 120°C for 2 hours.

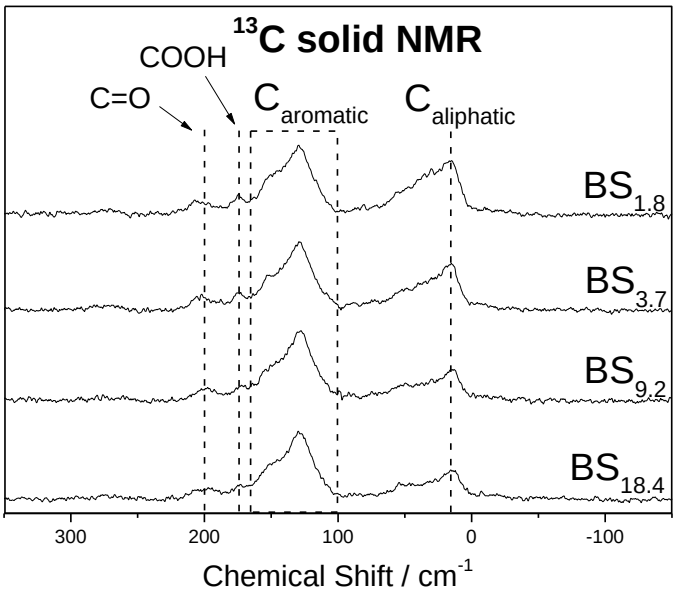

Fig S5. Solid-state ^{13}C NMR spectra and of samples $BS_{1.8}$, $BS_{3.7}$, $BS_{9.2}$, $BS_{18.4}$ (CP/MAS spectra).

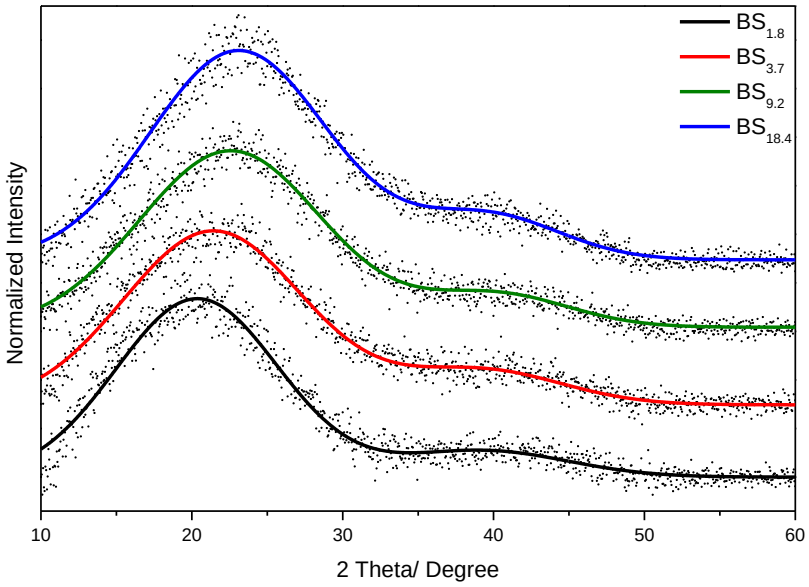

Fig S6. X-rays diffratograms of samples $BS_{1.8}$, $BS_{3.7}$, $BS_{9.2}$, and $BS_{18.4}$.

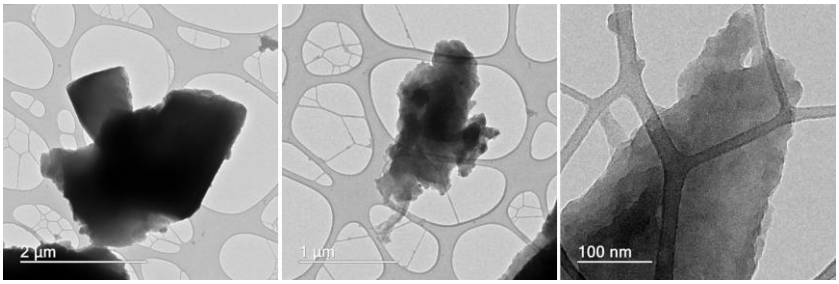

Fig S7. TEM images obtained of the sample $BS_{9.2}$ at 120 °C after 15 minutes of reaction.

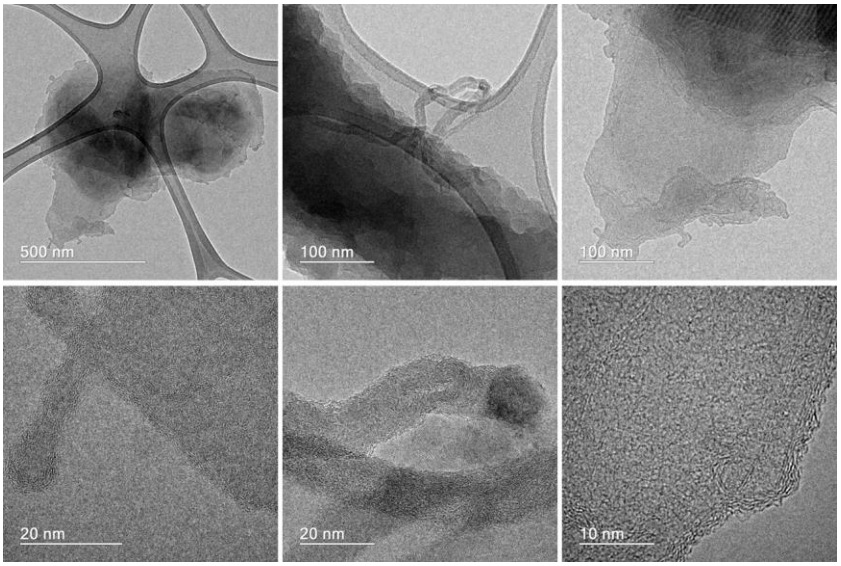

Fig S8. TEM images obtained of the sample $BS_{9.2}$ at 120 °C after 60 minutes of reaction.

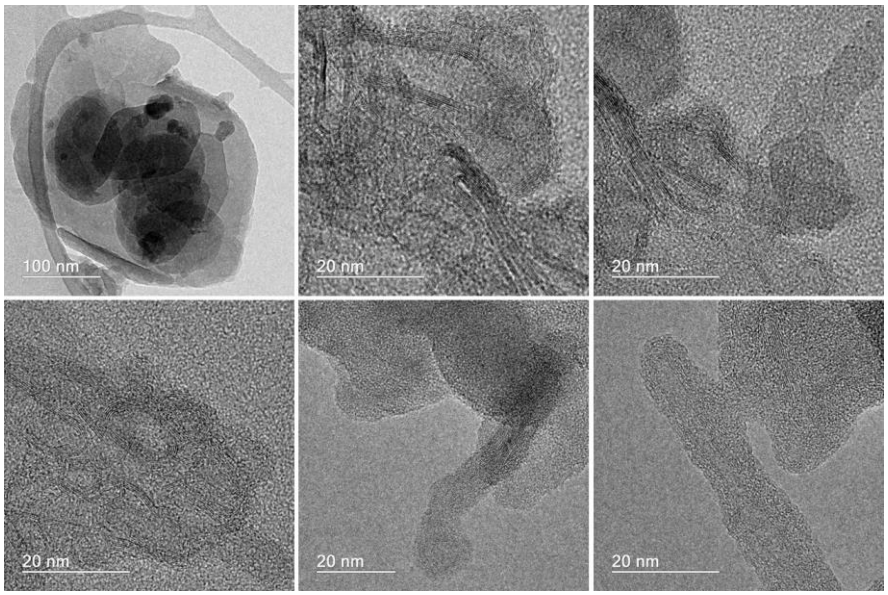

Fig S9. TEM images obtained of the sample $BS_{9.2}$ at 120 °C after 240 minutes of reaction.

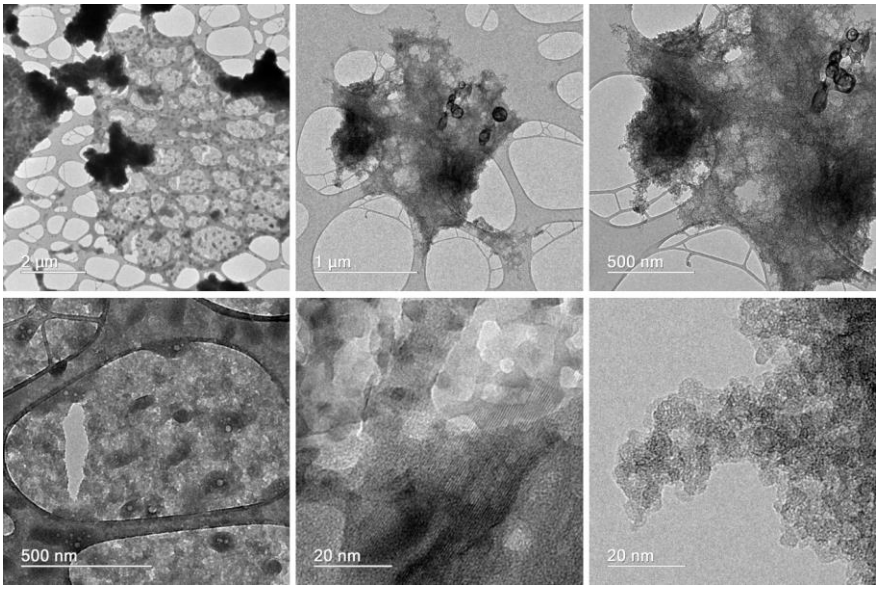

Fig S10. Transmission electron microscopy images obtained of the aqueous fraction after washing the materials.