catalysts

MDPI

Supplementary Materials

Preparation of Granulated Biomass Carbon Catalysts—Structure Tailoring, Characterization, and Use in Catalytic Wet Air Oxidation of Bisphenol A

Riikka Juhola [1,*], Anne Heponiemi [1], Sari Tuomikoski [1], Tao Hu [1], Mika Huuhtanen [2], Davide Bergna [1,3] and Ulla Lassi [1,3]

[1] Research Unit of Sustainable Chemistry, University of Oulu, P.O. Box 4300, FI-90014 Oulu, Finland; anne.heponiemi@oulu.fi (A.H.); sari.tuomikoski@oulu.fi (S.T.); tao.hu@oulu.fi (T.H.); davide.bergna@chydenius.fi (D.B.); ulla.lassi@oulu.fi (U.L.)
[2] Environmental and Chemical Engineering, University of Oulu, P.O. Box 4300, FI-90014 Oulu, Finland; mika.huuhtanen@oulu.fi
[3] Unit of Applied Chemistry, Kokkola University Consortium Chydenius, University of Jyvaskylä, FI-67100 Kokkola, Finland
* Correspondence: riikka.juhola@oulu.fi

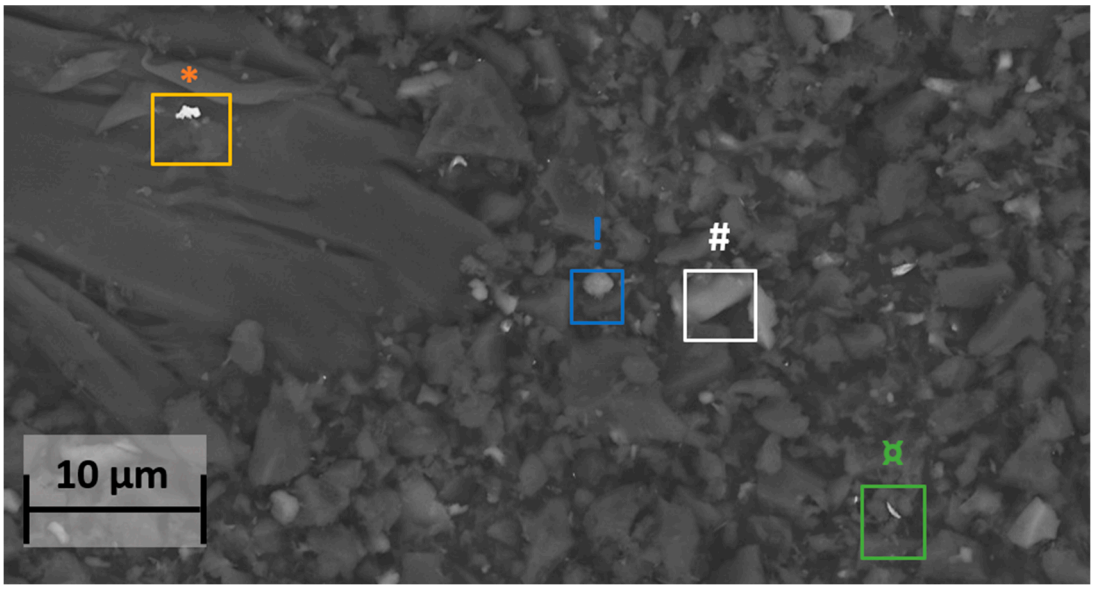

Figure S1 SEM micrograph of AC/MK_Fe. The differently colored frames in the image indicate certain elements analyzed by EDS; Orange (*): Fe, Blue (!): aluminum, White (#): Si, green (¤): Ca.

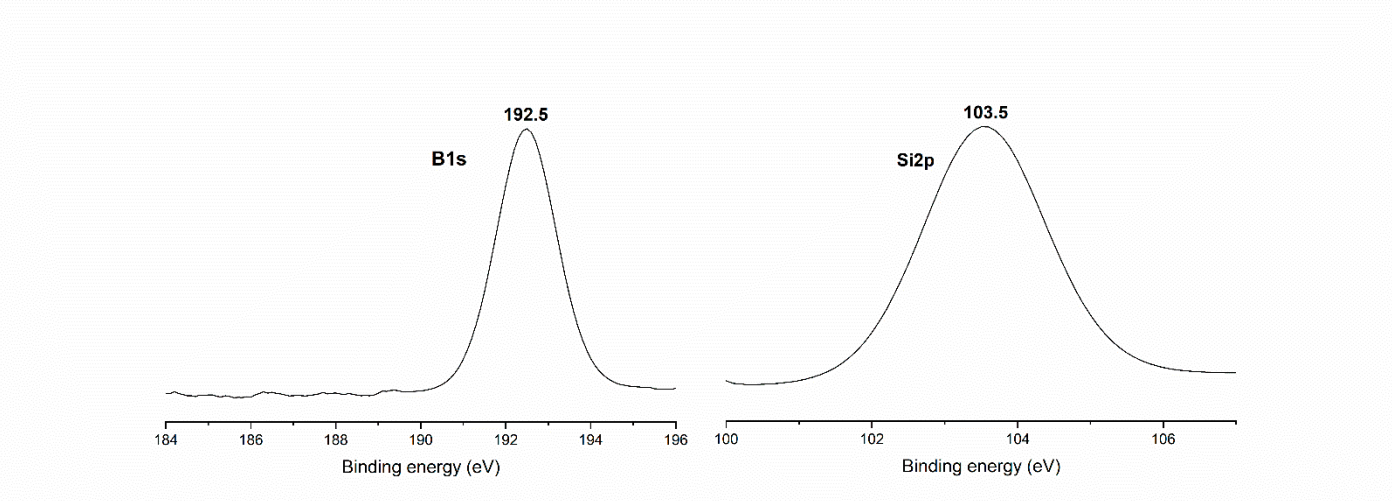

Figure S2. B1s and Si2p XPS spectra for the PSD/MK sample.

Table S1. Data obtained from XPS C1s spectrum. Binding energies and relative atomic contents.

Sample	Binding energy (eV) and the atomic abundance (%)				
	284.5–284.7	285.7–285.9	286.6	288.2–288.7	290.2–290.3
	C–C	C–O	C=O	O–C=O	π–π* in aromatic ring
AC/MK	24.4	10.8	20.9	1.9	0.5
AC/MK_Fe	29.5	18.0	16.8	3.2	0.6
PSD/MK	24.1	17.3	14.8	3.2	0.4
PSD/MK_Fe	26.2	8.9	24.6	3.8	1.2

Table S2. Data obtained from XPS O1s spectrum. Binding energies and relative atomic contents.

Sample	Binding energy (eV) and the atomic abundance (%)		
	531.6–531.8	532.5–532.7	533.4–533.6
	C=O, O–C=O	C–O, C–O–C	COOH
AC/MK	5.9	15.9	6.5
AC/MK_Fe	3.3	9.1	3.8
PSD/MK	7.1	14.7	5.8
PSD/MK_Fe	4.2	13.7	6.3

Table S3. Specific surface area and porosity profile of spent catalysts.

Sample	SSA	Pore size	Total pore volume	Micro	Meso	Macro
	(m^2/g)	(nm)	(cm^3/g)	Porosity (%)		
AC/MK_Fe	410	3.08	0.20	54.3	45.2	0.5
PSD/MK_Fe	361	3.71	0.22	42.3	57.7	-

Table S4. Elementary analysis of spent catalysts.

Sample	ICP-OES						Elemental analysis			
	Al	Fe	Ca	P	Si	B	C	H	N	O
	(wt%)	(wt%)	(wt%)	(wt%)	(wt%)	(wt%)	(wt%)	(wt%)	(wt%)	(wt%)
AC/MK_Fe	0.9	0.5	0.3	1.6	3.8	3.8	55.7	22.7	0.8	13.5
PSD/MK_Fe	0.7	0.8	0.2	0.8	2.9	2.1	63.2	20.1	0.7	12.5