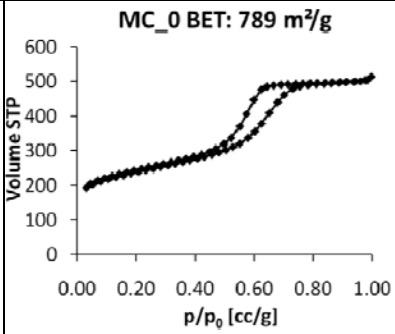
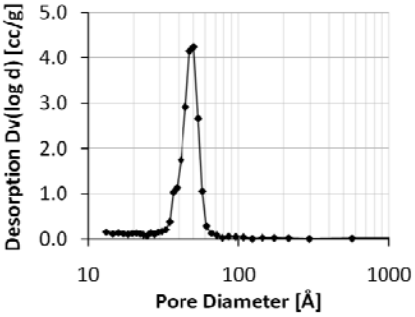
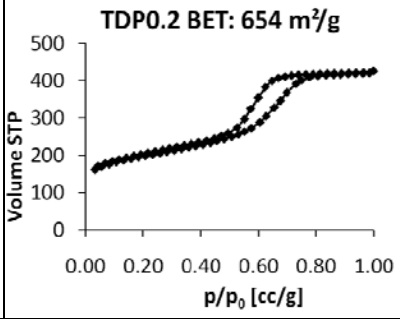
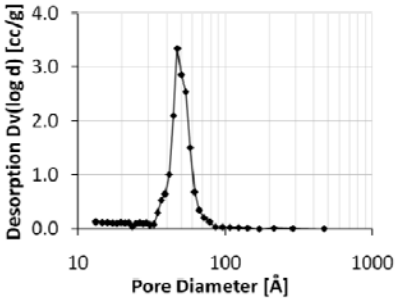
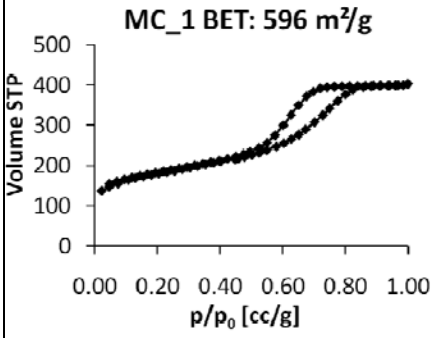
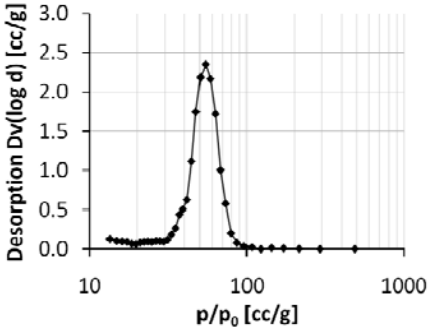
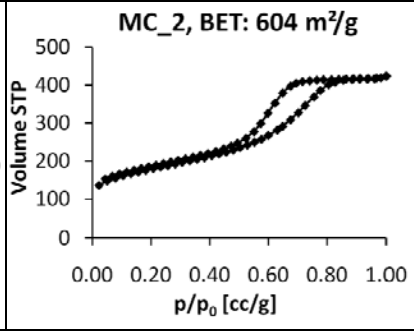
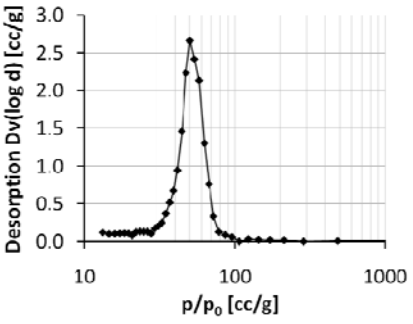
Supplementary Information

SI 1. Nitrogen adsorption measurements

Table 6: BET isotherms of mesoporous carbon samples investigated by XPS

Sample	SN	BET isotherm	BJH poresize distribution
MC_0	10921		
TDP0.2	11108		
MC_1	11466		
MC_2	11690		

SI 2. Cl impurities and their evolution during heat and vapor treatment

Table 7: Quantification of Cl species of MC_1 and MC_2 during in-situ XPS

Experiment		Process step	Total Cl content [%]
Heating in vacuum and subsequent addition of 0.1 mbar vapor	MC_1	RT	0.4
		80°C	0.2
		130°C	0.2
		$130°C_{vapor}$	0.1
	MC_2	RT	0.2
		80°C	0.1
		130°C	0.1
		$130°C_{vapor}$	0.1
Heating in 0.1 mbar vapor pressure	MC_1	RT_{vapor}	0.3
		$80°C_{vapor}$	0.3
		$130°C_{vapor}$	0.2
	MC_2	RT_{vapor}	0.2
		$80°C_{vapor}$	0.2
		$130°C_{vapor}$	0.3

The acidic pH during the oxidation treatment in hydrogen peroxide is achieved by the addition of hydrochloric acid to the reaction mixture. As observed in the survey spectra, part of the hydrochloric acid reacted with the carbon material and formed chloro-functionalized surface species on the material. In order to give a complete comparison of the two samples MC_1 and MC_2 the Cl2p peaks have been examined in detail. The main feature of the Cl2p is located at ~200.4 eV. This can be related to chlorinated polymers like polyethylene or chlorinated benzene-like molecules [Moulder J, Stickle W, Sobol P. Handbook of X Ray Photoelectron Spectroscopy; 1992]. Sample MC_2 exhibits a smaller amount of Cl than sample MC_1 at room temperature (Table 7) and only MC_1 shows a decrease of the Cl signal with increasing T under vacuum conditions. This effect proceeds also under water exposure at 130°C, where the intensity of MC_1 reaches values comparable to the average Cl signal of MC_2. The addition of vapor during

the heat treatment seems to stabilize the Cl-functional groups in both samples. Minor differences were detected both for the different samples MC_1 and MC_2, as well as for the different temperature steps.

Although the total amount of chlorine functional groups is with < 0.5% small in comparison to 12% oxygen content, an effect on the catalytic performance of the two materials cannot be excluded.

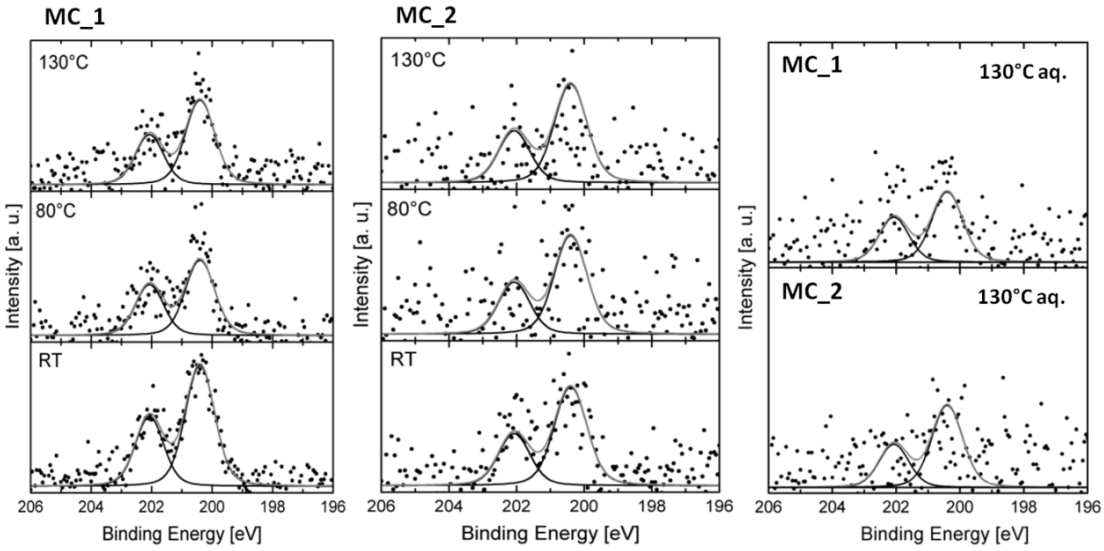


Figure 9: Cl 2p spectra for MC_1 and MC_2 during heating in vacuum

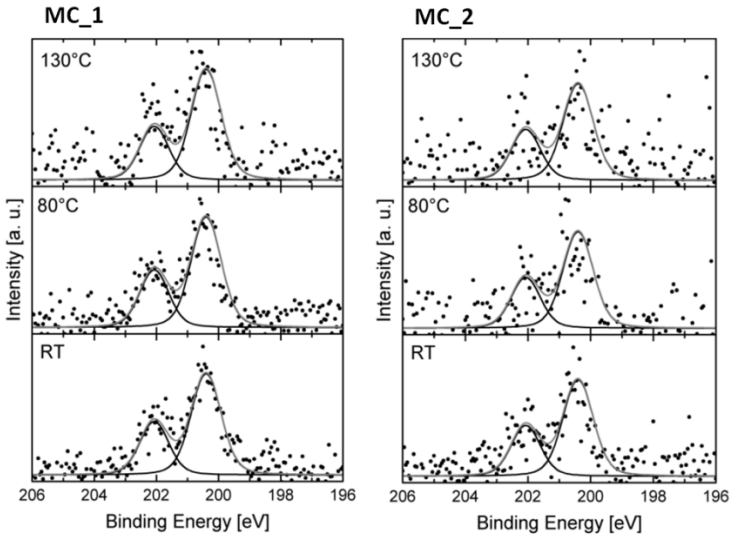


Figure 10: Cl 2p spectra for MC_1 and MC_2 during heating in vapor

SI 3. Additional information on evaluation of C1s and O1s signals

Table 8: Quantification of oxygen species of MC_0, MC_1 and MC_2 by ex-situ XPS [%]

Sample	530.5 eV	531.2 eV	531.9 eV	532.7 eV	533.5 eV	534.2 eV	Total oxygen content
MC_0	0.3	0.5	0.8	1.6	1.9	0.2	5.3
MC_1	0.4	1.5	1.4	3.0	4.0	0.8	11.1
MC_2	0.4	1.8	1.6	3.4	4.4	0.5	12.1

Table 9: Quantification of carbon species in the C1s pectra of MC_0, MC_1 and MC_2 obtained by ex-situ XPS [%]

Sample	284.4 eV	284.7 eV	285.2 eV	285.9 eV	286.6 eV	287.9 eV	288.5 eV	289.1 eV	Total carbon content
MC_0	40.0	27.7	4.7	2.4	2.9	1.8	5.9	1.2	94.8
MC_1	37.0	26.7	4.9	3.0	4.0	2.4	0.6	1.8	88.6
MC_2	43.0	15.7	5.1	2.9	3.4	2.3	0.5	1.1	87.7

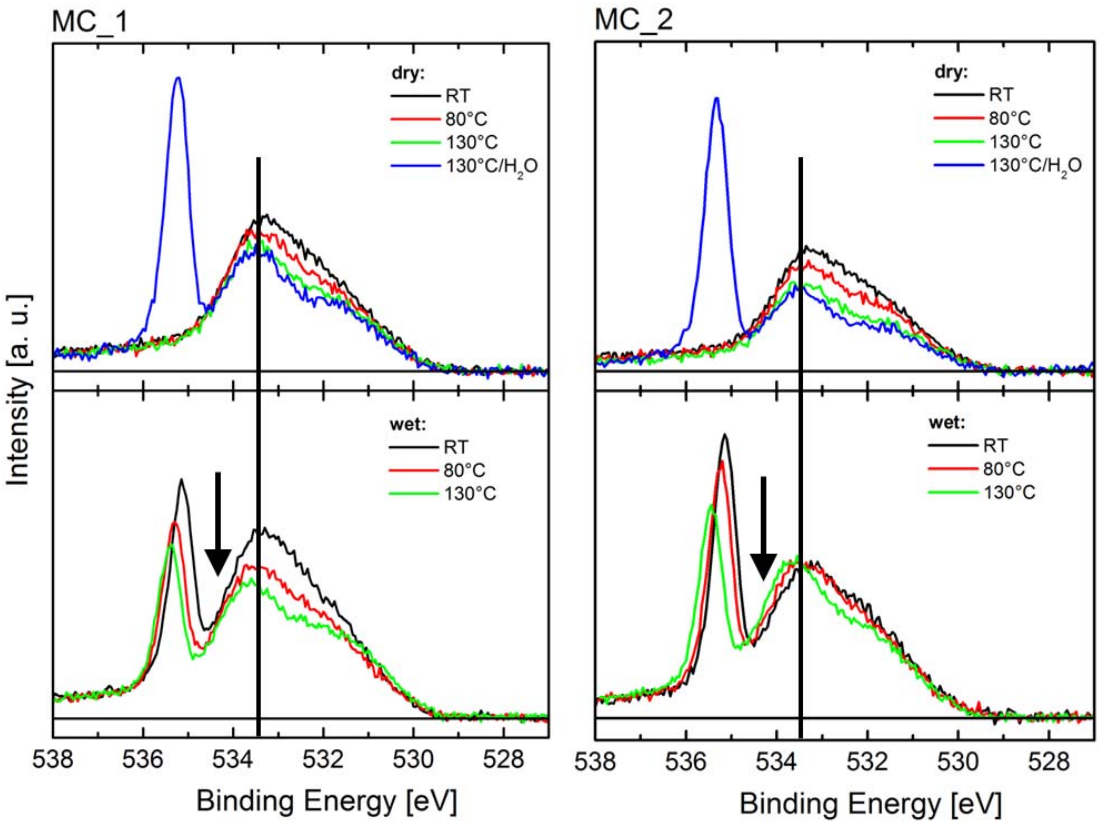


Figure 11: Insitu XPS spectra of sample MC1 (left) and MC2 (right). The line in the figure corresponds to the main intense 533.4 eV peak. The arrow points to a new feature developing while water exposure.

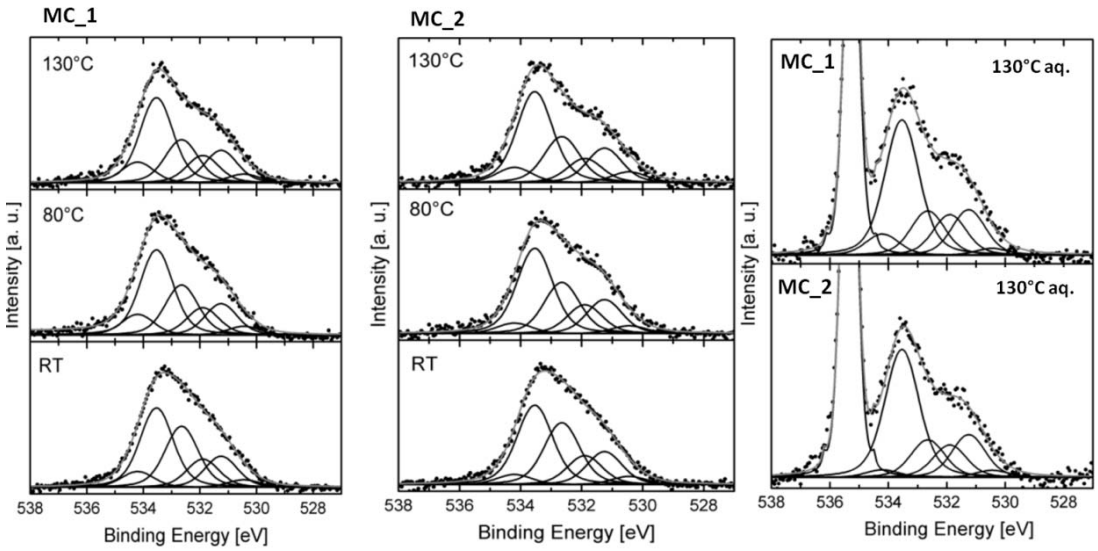


Figure 12: Fits for O1s spectra of MC_1 and MC_2 during heating in vacuum

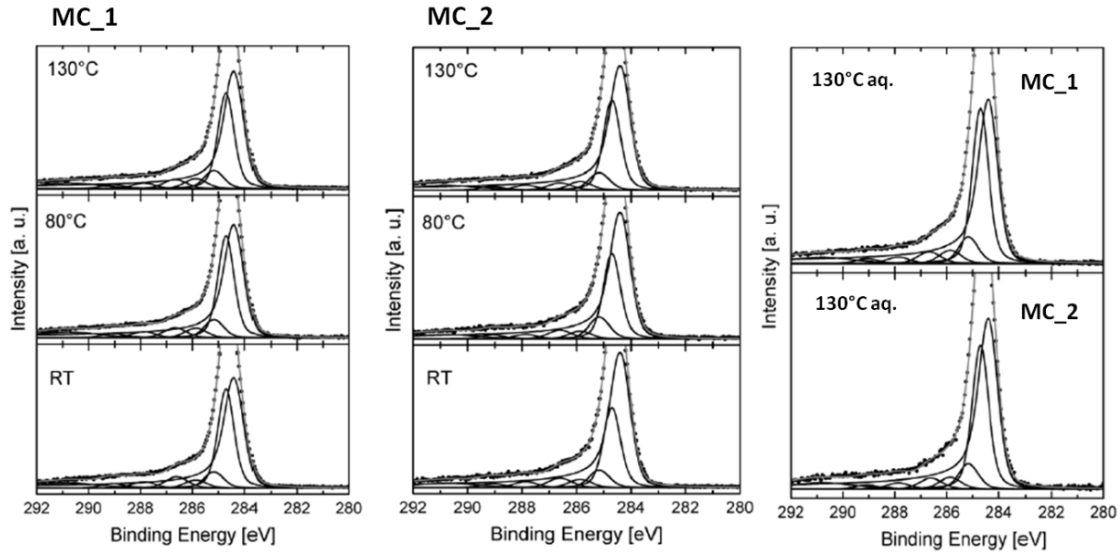


Figure 13: Fits for C1s spectra of MC_1 and MC_2 during heating in vacuum

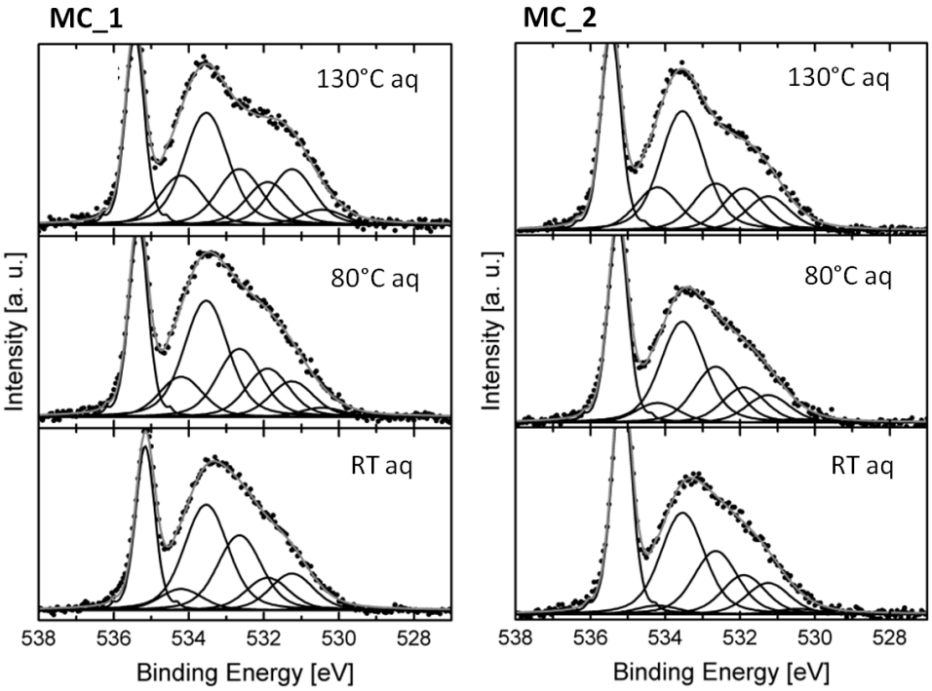


Figure 14: Fits for O1s spectra of MC_1 and MC_2 during heating in 0.1 mbar vapor

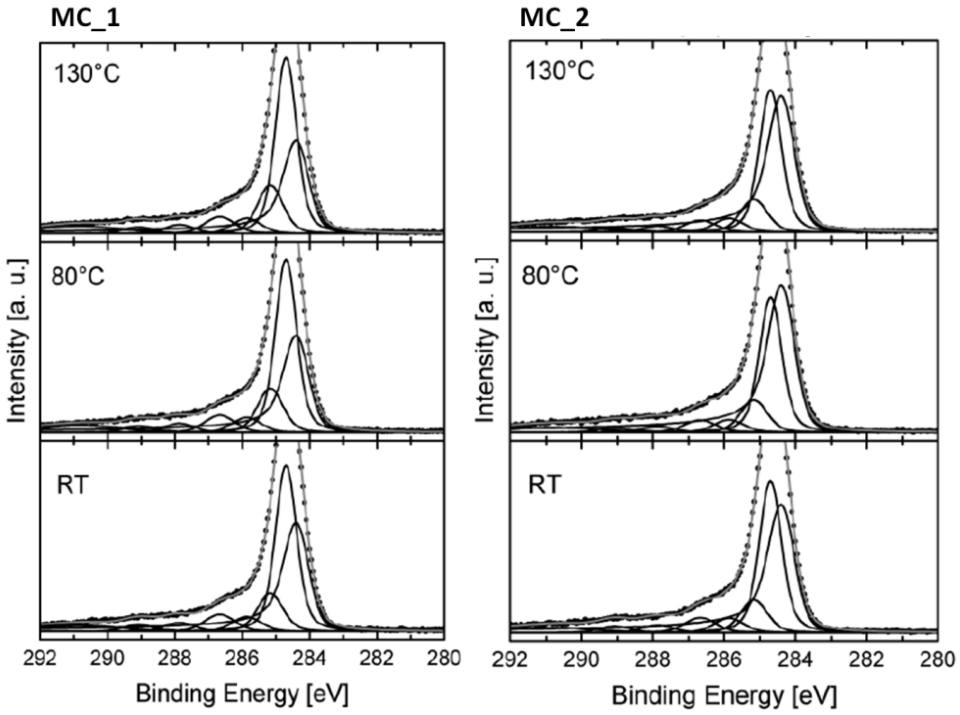


Figure 15: Fits for C1s spectra of MC_1 and MC_2 during heating in 0.1 mbar vapor