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Supporting Information

Decomposition Synthesis of Tuneable, Macroporous Carbon Foams from Crystalline Precursors via In Situ Templating

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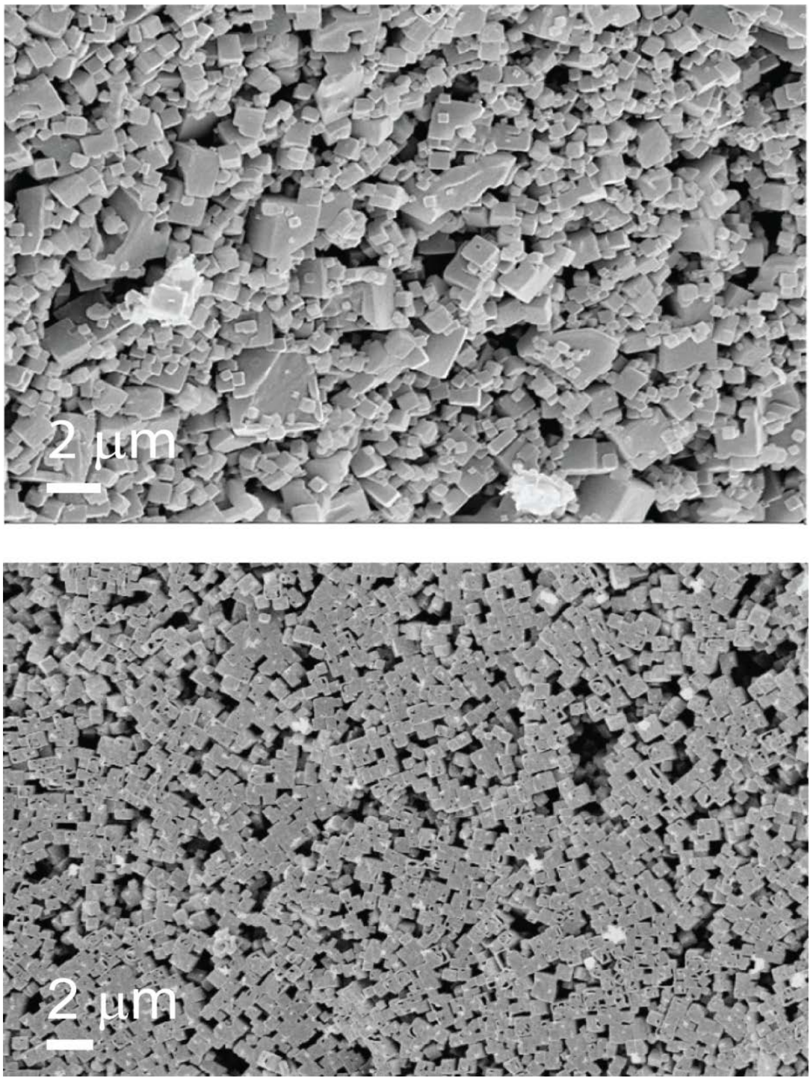

Figure S1. SEM images of NaAc-Cl decomposition products heated with 10 K min^{-1} in a muffle furnace (top) or ultrafast, with a heat gun set up (bottom). The NaCl crystallites become more uniform upon fast heating.

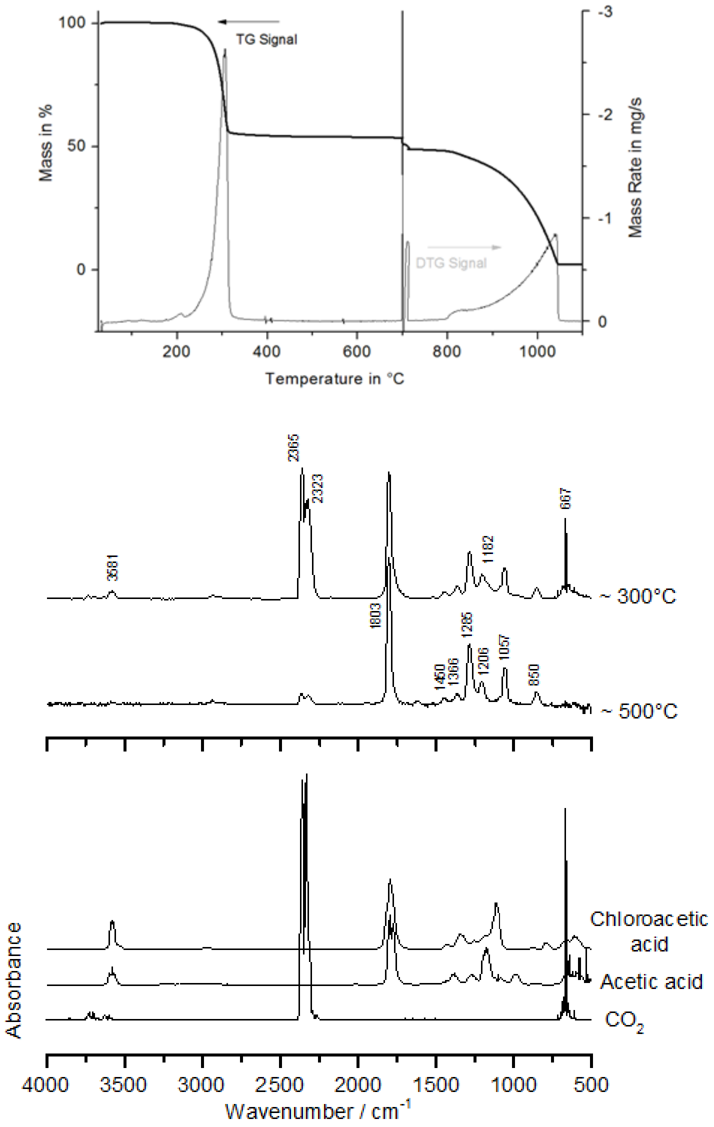

Figure S2. A FTIR coupled TG analysis was performed to monitor the decomposition of NaAc-Cl. The black line in the TG curve (top) indicates the switch from nitrogen atmosphere to air. FTIR spectra of volatile products obtained in the relevant decomposition steps are compared to reference spectra at the bottom. The change around 300 °C can be attributed to the loss of CO_2, water, acetic acid and a further unknown hydrocarbon component. Detailed analysis of the specific bands and the comparison with spectra from database reveals an anhydride. The characteristic carbonyl bond at 1803 cm^{-1} (C=O), the ester vibrations at 1285 and 1057 cm^{-1} (C-O-C), the aliphatic vibrations at 2931 and 2886 cm^{-1} as well as 1450 and 1366 cm^{-1} ($-CH_2-$) and probably some deformation bands at 850 cm^{-1} identifies the anhydride as succinic acid anhydride. The small step above 700°C can be attributed to the formation of CO_2 and water, indicating the thermo-oxidative decomposition of carbon char. Between 800°C and 1100°C the formation of HCl can be observed, indicating the decomposition of NaCl.

FTIR coupled thermogravimetric measurements were performed on a TGA/SDTA 851 produced by Mettler Toledo coupled by a thermo TGA interface to a FTIR spectrometer Nexous 470 from Nicolet Instruments equipped with a DTGS KBr detector. The decomposition was monitored between 25 °C and 700 °C with a heating rate of 10 K min^{-1} under nitrogen flow (30 mL min^{-1}) and between 700 °C to 1000 °C under synthetic air.

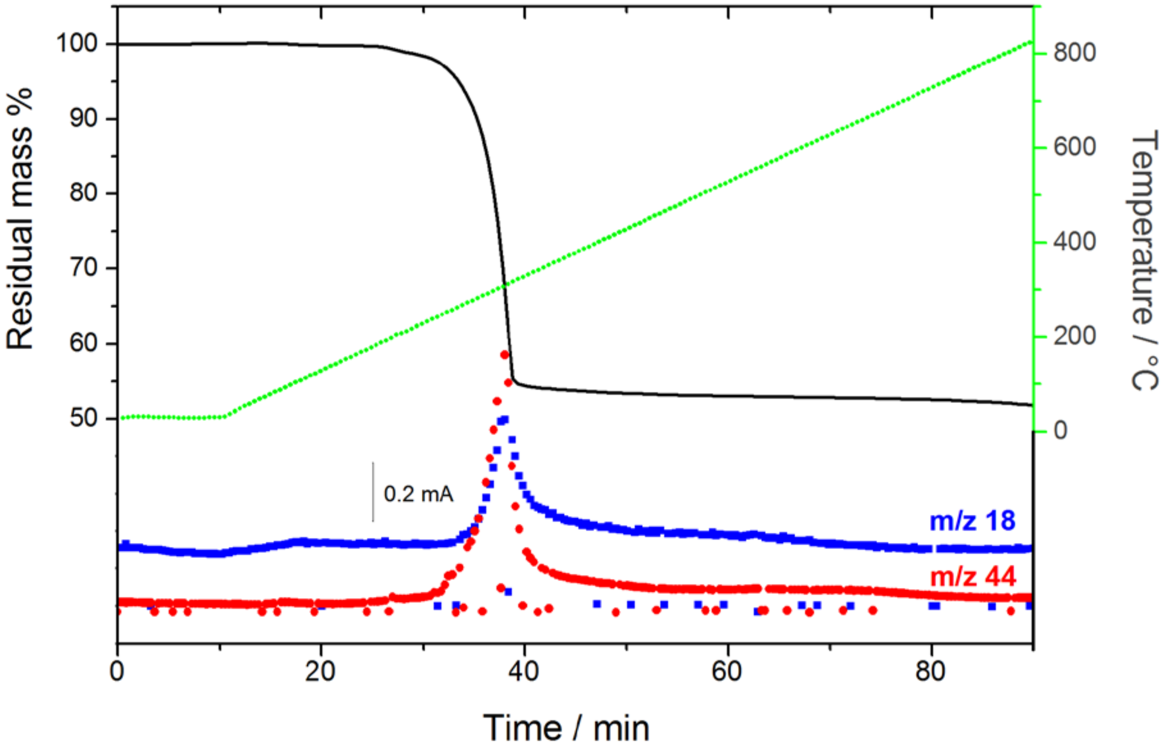

Figure S3. MS coupled TGA analysis was performed to track the evolution of H_2O (m/z 18) and CO_2 (m/z 44) as main volatile decomposition products. However, the evolution of acetic acid (m/z 60), as indicated by FTIR-MS, could not be confirmed, presumably due to slightly modified decomposition mechanisms under different reaction conditions.

TG-MS analyses were performed with a Netsch LibraTG209 F1device coupled to a Pfeiffer GSD 301 gas analyzer. N_2 was used as carrier gas and a heating rate of 10 K min^{-1} was applied.

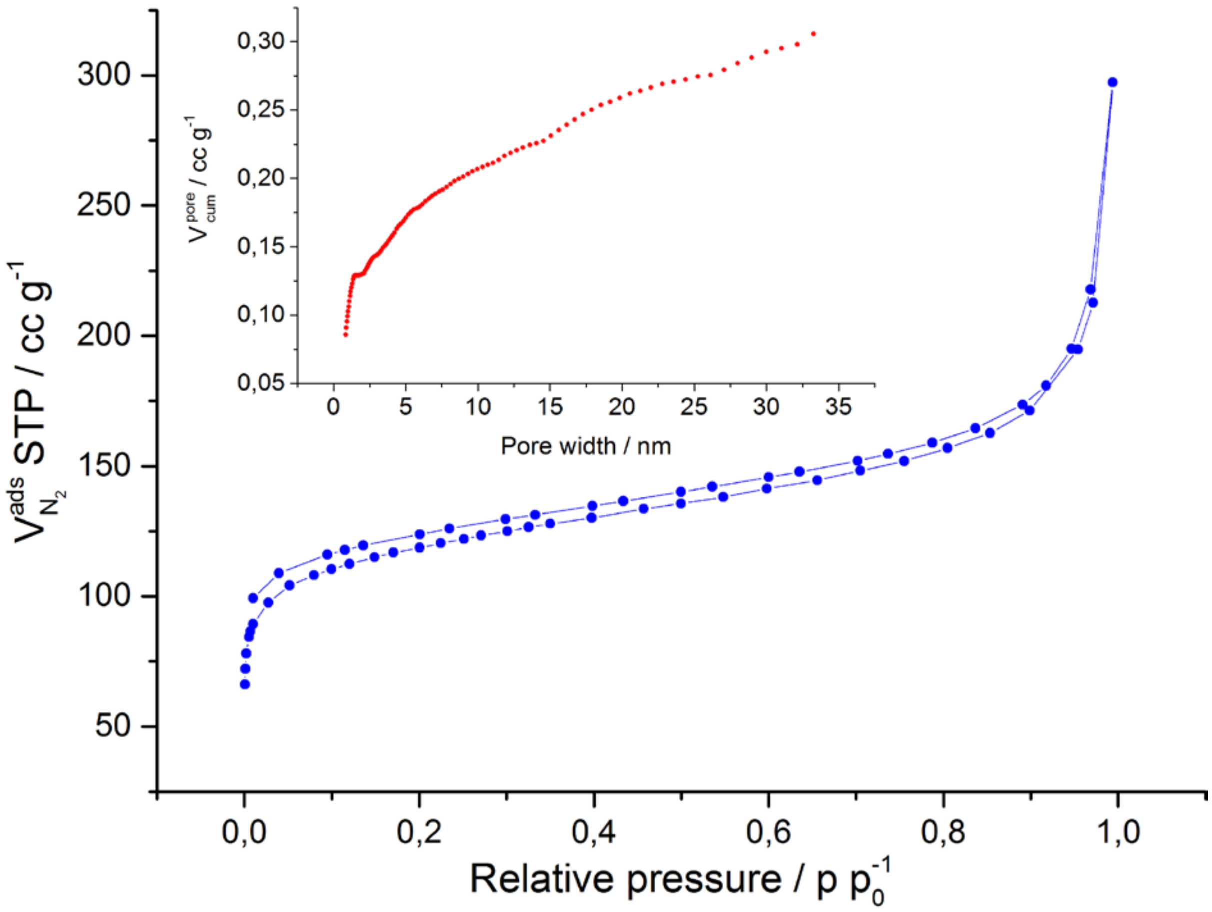

Figure S4. Graphs of nitrogen sorption isotherms of a NaAc-Cl derived carbon monolith and the corresponding cumulative pore volume (inset) are shown. The sharp increase of the adsorption branch in at $p/p^0 < 0.02$ indicates the presence of micropores in-line with the rough surface seen in HRSEM/TEM. The cubic voids with large size distribution in the meso-and macroporous range furthermore lead to the slight increase in the higher p/p^0 region.

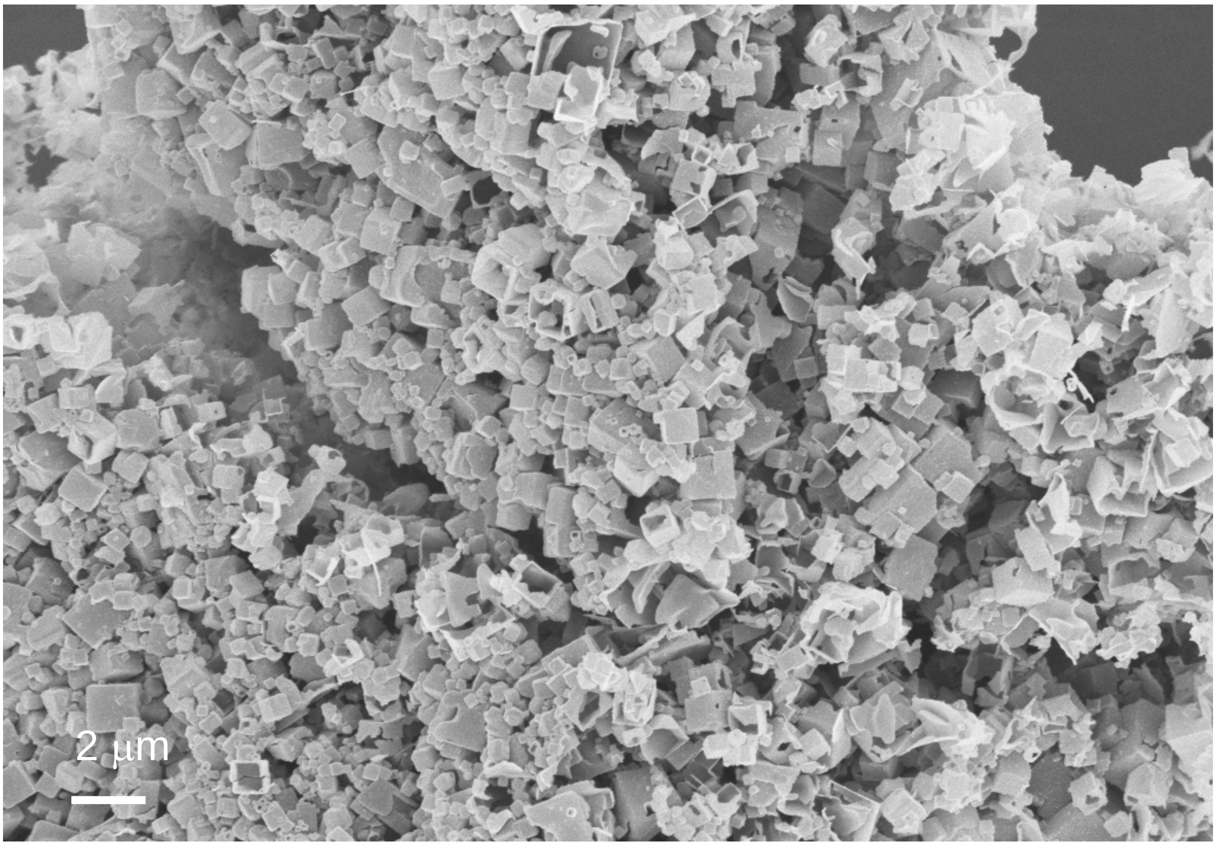

Figure S5. SEM image of a NaAc-Cl derived carbon foams after thermal post treatment at 1200 °C.

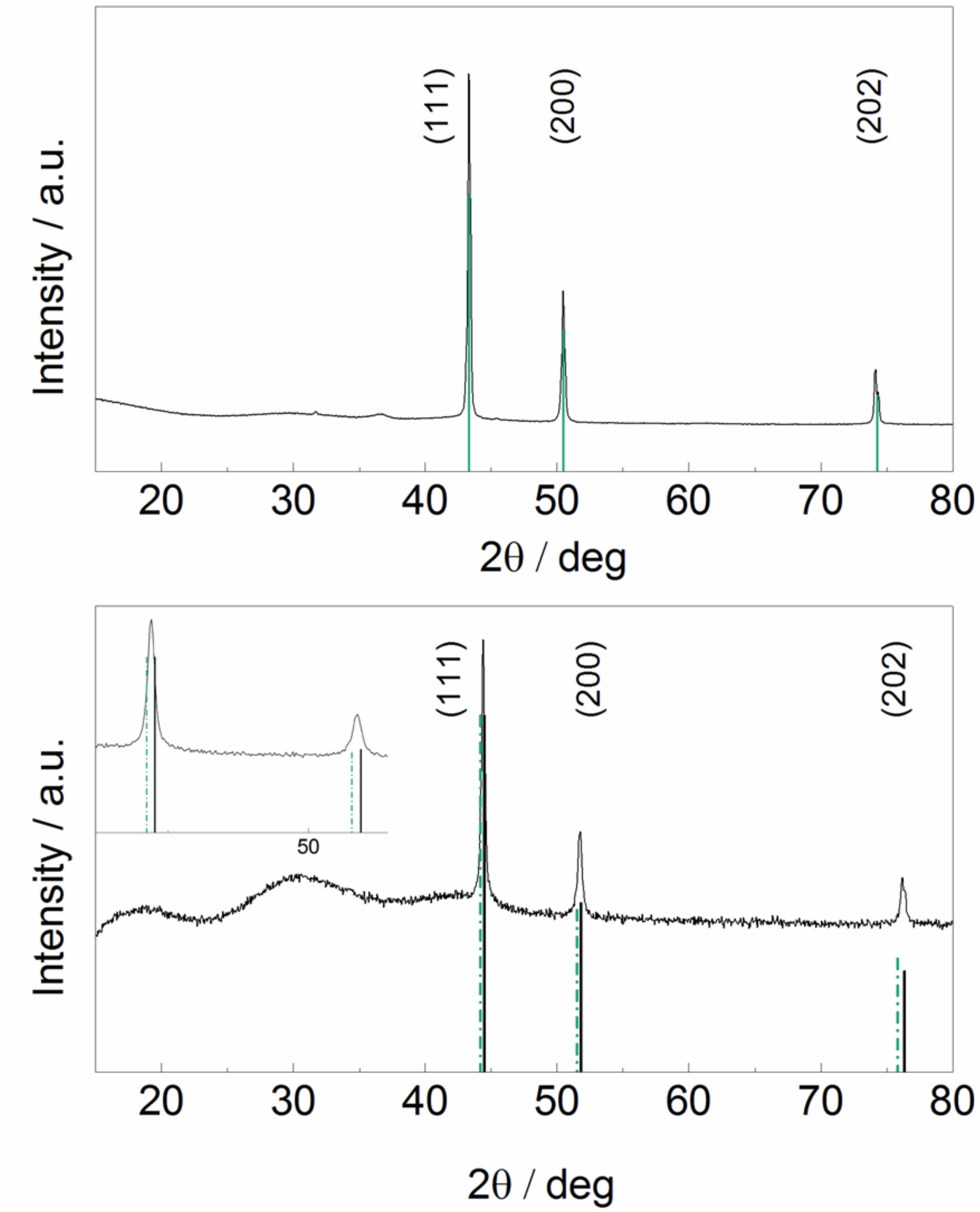

Figure S6. Powder X-ray diffraction patterns of metal nanoparticles decorated carbons: Cu (top, ICDD: 00-004-0836) CoNi (bottom, ICDD: Co 00-015-0806 dotted line; Ni 00-004-0850 straight line).