

Supplementary files to:

CVD-coated carbon xerogels for negative electrodes of Na-ion batteries

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Physico-chemical characterization

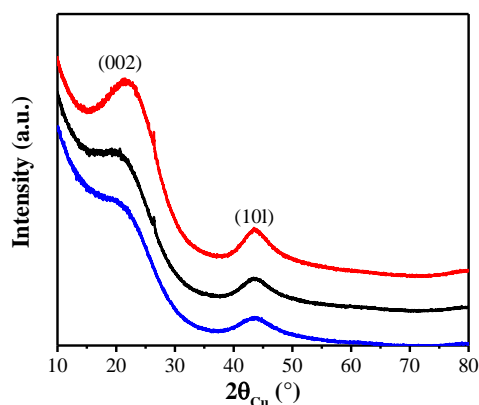


Figure S.I.1. X-ray diffractograms of CX-LPH pyrolyzed at 800 °C (—) and at 900 °C (—), and CX-LPH-C (—).

Table S.I.1. Structural parameters of CX-LPH pyrolyzed at 800 °C and 900 °C, and CX-LPH-C samples.

			CX-LPH	CX-LPH	CX-LPH-C
Pyrolysis/processing temperature (°C)			800	900	900
XRD	L_a	(nm)	3.38 ± 0.01	3.34 ± 0.01	3.82 ± 0.01
	L_c	(nm)	1.09 ± 0.19	1.04 ± 0.16	0.99 ± 0.11
	$d_{(002)}$	(nm)	0.405 ± 0.001	0.409 ± 0.001	0.392 ± 0.001

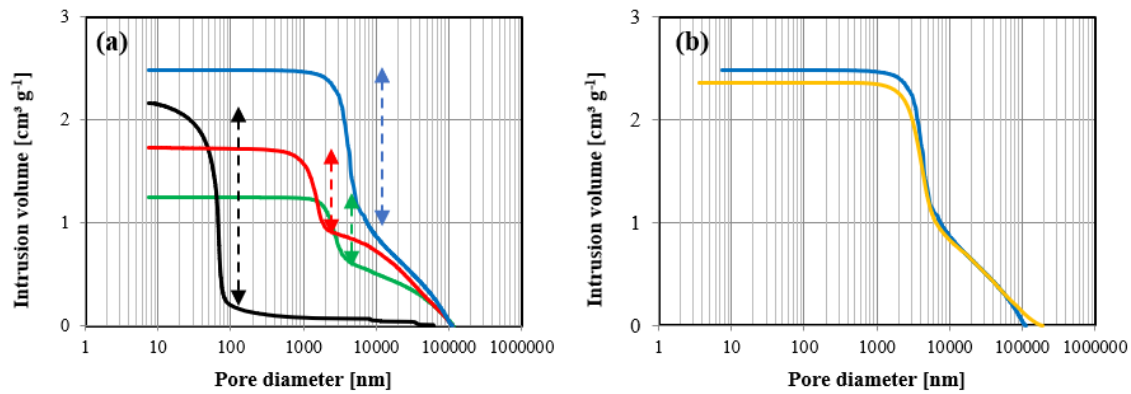


Figure S.I.2. Cumulated pore volume as a function of the pore diameter, d_p , measured by Hg porosimetry. (a) Uncoated samples: CX-450 (—), CX-1500 (—), CX-2500 (—), CX-LPH (—); (b) comparison between uncoated and coated samples: CX-LPH (—) and CX-LPH-C (—). The intrusion volume corresponding to the meso/macropore volume of the material (excluding intrusion between particles) is indicated by vertical arrows.

Table S.I.2. Electrochemical performance of the carbon xerogels.

Sample	$C_{\text{tot,disch}}$	C_{irrev}	C_{rev}	ICE	C_{slope}	C_{plateau}
	(mAh g ⁻¹)	(mAh g ⁻¹)	(mAh g ⁻¹)	(%)	(mAh g ⁻¹)	(mAh g ⁻¹)
CX-450	563 ± 104	398 ± 78	164 ± 26	29	164 ± 26 (29 %)	- ^a
CX-450-C	364 ± 31	211 ± 19	153 ± 15	42	126 ± 17 (35 %)	27 ± 2 (7 %)
CX-1500	323 ± 3	179 ± 4	143 ± 5	45	125 ± 3 (39 %)	19 ± 3 (6 %)
CX-1500-C	290 ± 8	56 ± 2	238 ± 7	81	147 ± 4 (51 %)	88 ± 3 (30 %)
CX-2500	329 ± 13	123 ± 20	206 ± 19	63	150 ± 8 (46 %)	56 ± 11 (17 %)
CX-2500-C	313 ± 38	68 ± 7	263 ± 39	79	170 ± 21 (55 %)	75 ± 10 (24 %)
CX-LPH	312 ± 27	64 ± 18	248 ± 12	80	150 ± 11 (48 %)	99 ± 5 (32 %)
CX-LPH-C	353 ± 12	56 ± 2	298 ± 11	84	169 ± 7 (48 %)	129 ± 7 (36 %)

^a No plateau observed.

$C_{\text{tot,disch}}$: total first discharge capacity.

C_{irrev} : irreversible capacity at first cycle.

C_{rev} : reversible capacity at first cycle.

ICE : Initial Coulombic Efficiency.

C_{slope} : capacity corresponding to the sloping part of the first discharge. Values into brackets are the percentage of the total discharge associated to the sloping part of the curve.

C_{plateau} : capacity corresponding to the low-voltage plateau of the first discharge. Values into brackets are the percentage of the total discharge associated to the low-voltage plateau of the curve.

Cycling in NIB half-cells

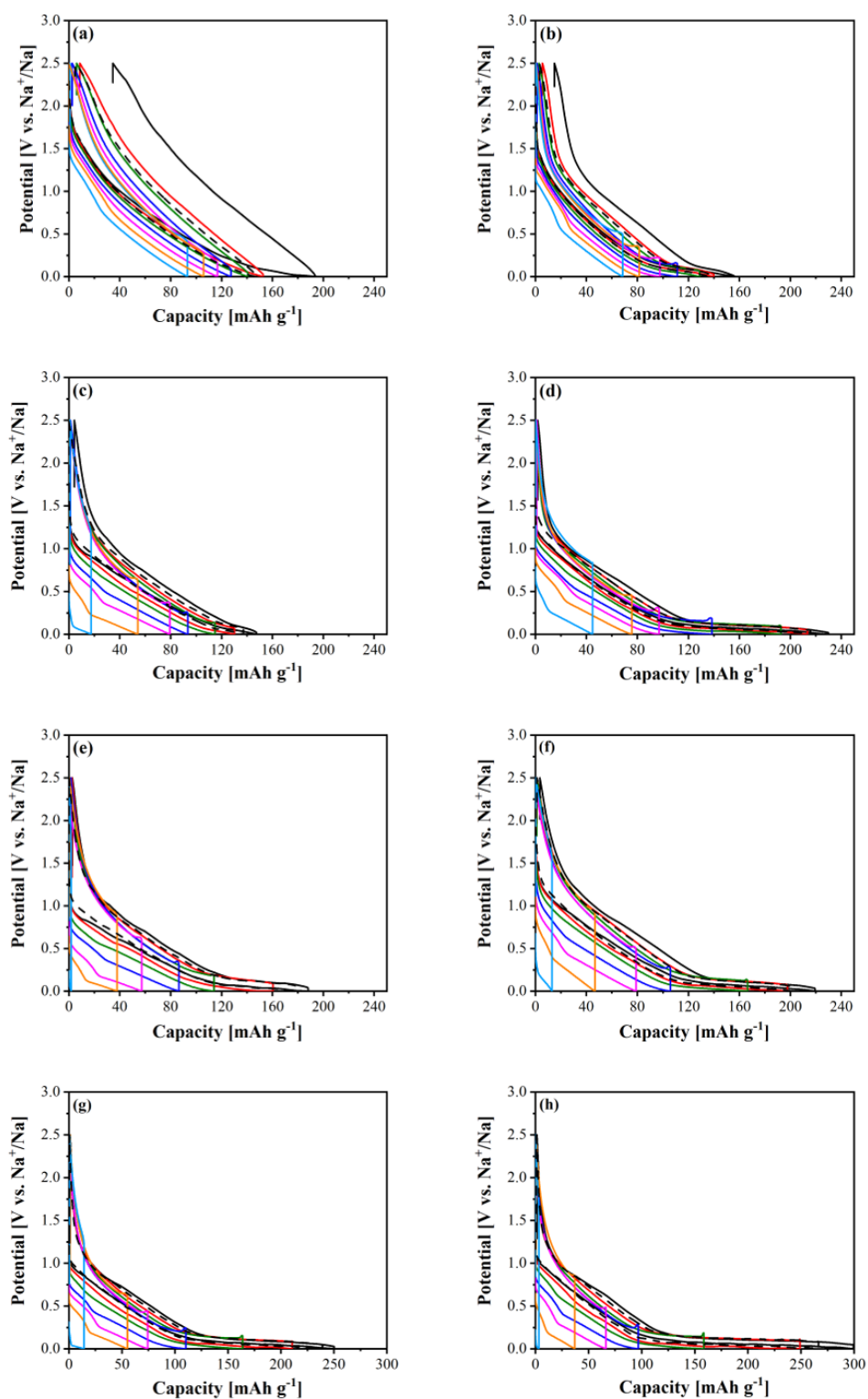


Figure S.I.3. 3rd cycle in half-cell configuration of (a) CX-450, (b) CX-450-C, (c) CX-1500, (d) CX-1500-C, (e) CX-2500, (f) CX-2500-C, (g) CX-LPH et (h) CX-LPH-C at C/20 (—), C/10 (—), C/5 (—), C/2 (—), C (—), 2C (—), 5C (—) and C/20 (—).

Li⁺ insertion-deinsertion in pristine CX and CVD-coated CX

The two materials selected correspond to samples CX-Ref (uncoated) and CX-CVD (CVD-coated) of reference [28]. The electrodes were prepared as detailed in reference [28] and in the present paper.

Half-cells were assembled in CR2032 coin cells [28], where the tested material acted as positive electrode and a Li-metal disk (MTI corp.) as the negative, reference and counter electrode. A Celgard[®] separator soaked with 80 μ L of LP71 (1 M LiPF₆ in EC:DEC:DMC 1:1:1) electrolyte was placed in-between. The cell assembly was performed in an Ar-filled glove-box (MBraun). Cyclic voltammetry was performed at a scan rate of 0.05 mV s⁻¹ between 0.005 and 1.5 V vs. Li⁺/Li with a Biologic VMP3 multichannel potentiostat at a controlled temperature of 25°C.

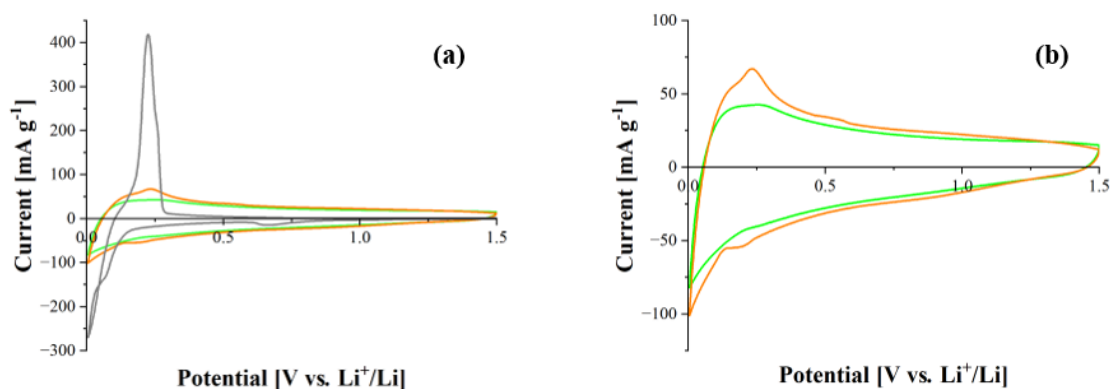


Figure S.I.4. Cyclic voltammeteries (cycle #10) in LIB half-cell configuration for graphite (—), uncoated CX (CX-Ref [28]) (—) and CVD-covered CX (CX-CVD [28]) (—). (a) All three samples, (b) CX-Ref and CX-CVD alone, to better distinguish the insertion/deinsertion peak at ~0.25 V vs. Li⁺/Li.