Electronic Supplementary Information (ESI) for

Valorisation of Used Lithium-Ion Batteries into Nanostructured Catalysts for Green Hydrogen from Boranes

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Supplementary Figures

Supplementary Tables

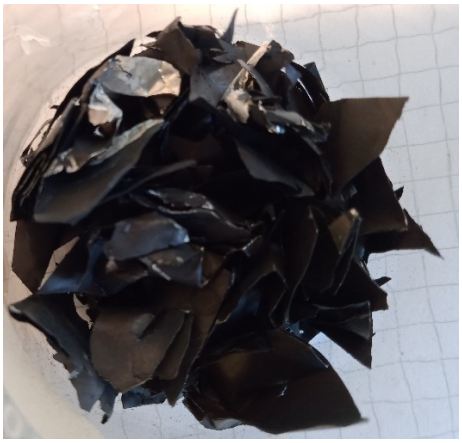

Figure S1. Scrapped electrode material from a HTC phone battery

Figure S2. Battery extract solution

Table S1.ICP-MS results from a sample of 1C

ICP-MS analysis of **1C**		
Element	wt%	Atom ratio to Co
Al	3,26	0,29
B	7,76	1,7
Co	24,5	1
Fe	0,041	0,0018
Li	0,064	0,022
Mg	0,064	0,0063
Mn	0,088	0,0039
Na	5	0,52
Ni	0,047	0,0019
P	0,23	0,018
Sum	41,1	

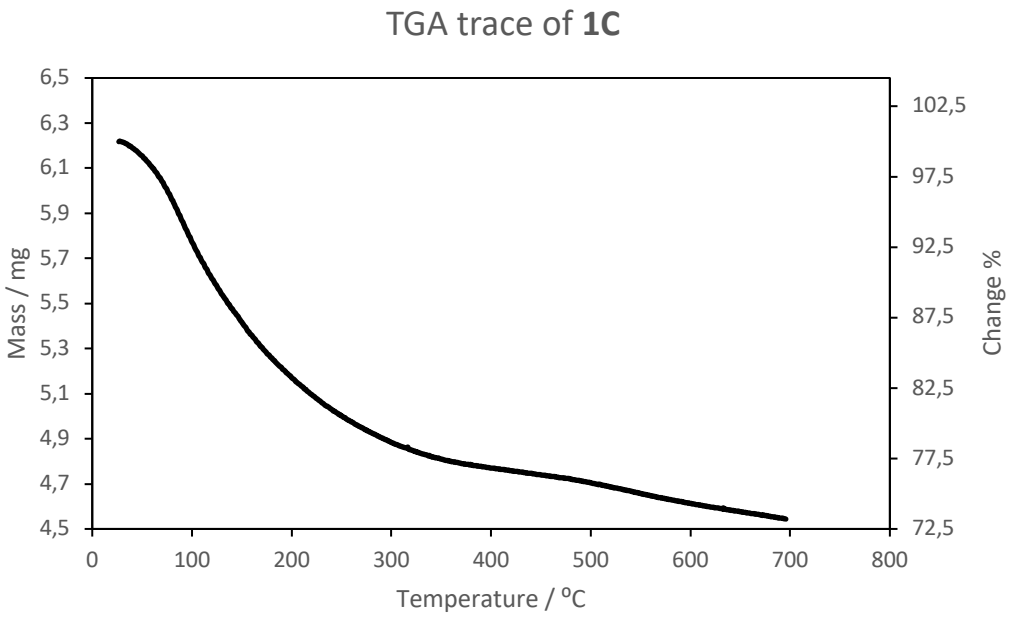

*Figure S3. TGA trace of **1C** under dry air.*

*Table S2. Quantitative EDS analysis of **1C***

Element	Family	Net intensity	Net background	K-factor	Absorption correction	Atomic fraction	Mass fraction	Fit error
-	-	counts	counts	-	-	%	%	%
C	K	2,03E+03	1,82E+01	1,00E+00	1,00E+00	35,1	24,21	5,38E+00
O	K	5,92E+03	2,26E+01	6,97E-01	1,00E+00	53,7	49,35	9,24E-01
Na	K	4,65E+02	6,64E+01	6,52E-01	1,00E+00	2,7	3,63	2,04E+00
Al	K	6,64E+02	5,23E+01	6,20E-01	1,00E+00	3,2	4,92	1,78E+00
S	K	4,34E+01	1,03E+02	5,96E-01	1,00E+00	0,2	0,31	1,33E+01
Co	K	1,78E+03	1,55E+02	8,28E-01	1,00E+00	5,2	17,59	4,30E-01

*Table S3. Quantitiative EELS analysis of **1C***

O (at %)	F (at %)	Co (at %)
73.4	18.1	8.5

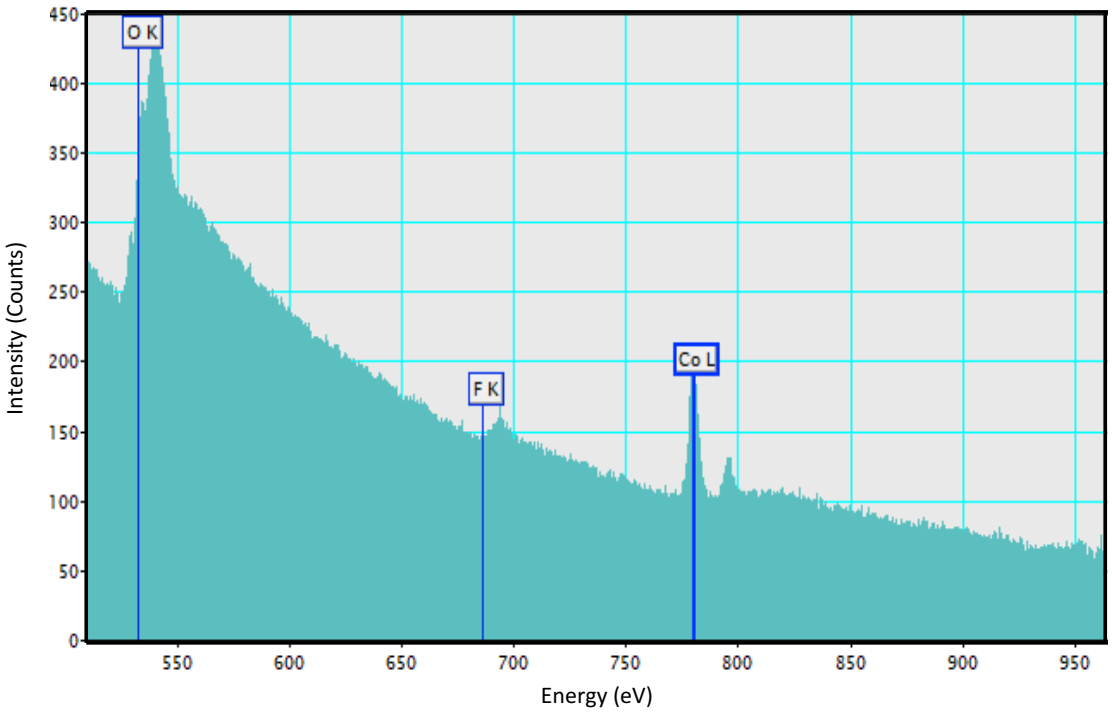

*Figure S4. Core-loss STEM-EELS spectrum of **1C***

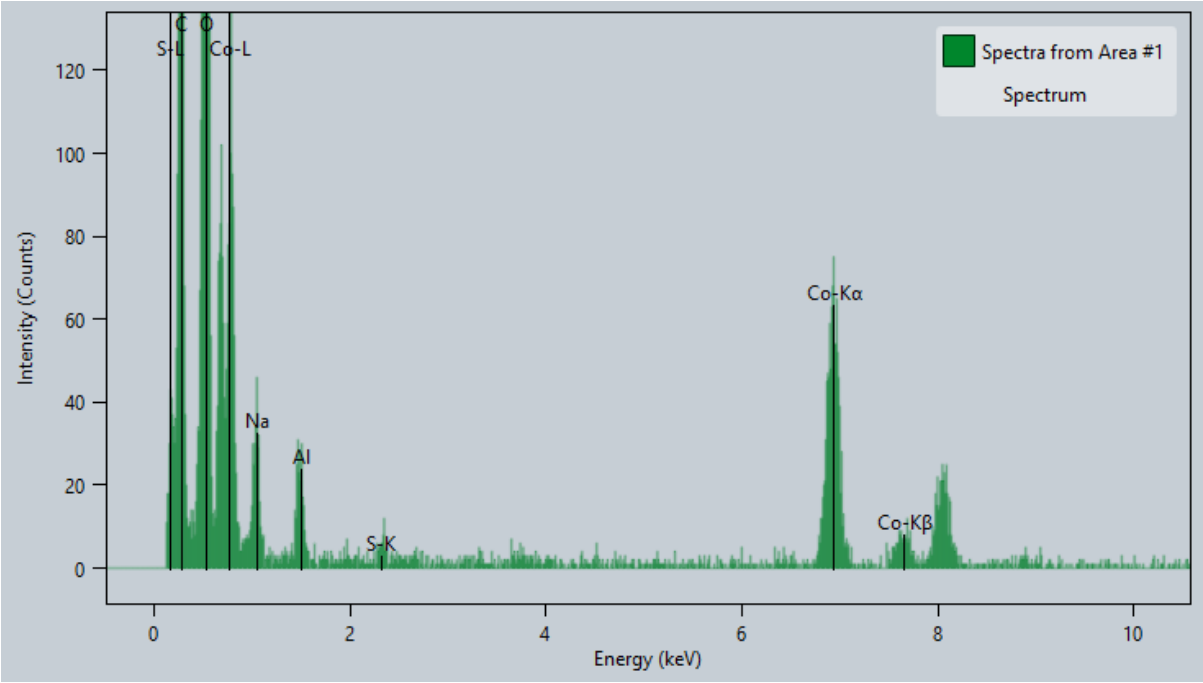

*Figure S5. STEM-EDS spectrum of **1C***

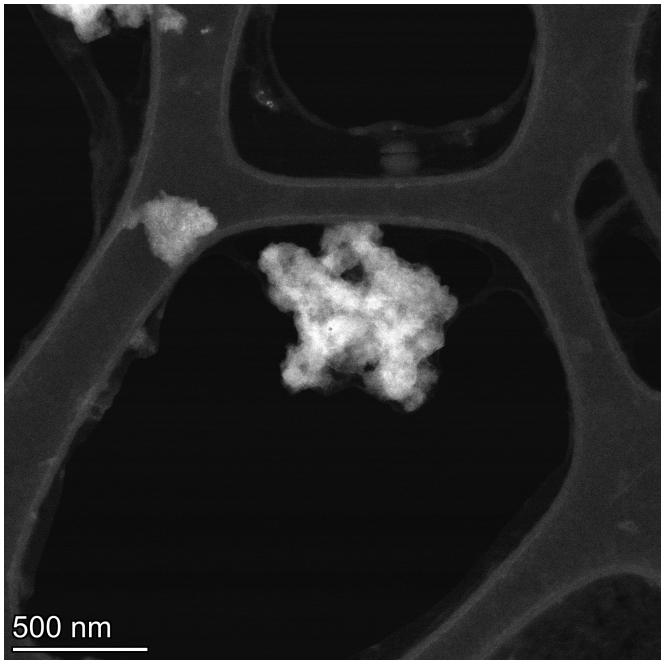

*Figure S6. Additional STEM image of **1C***

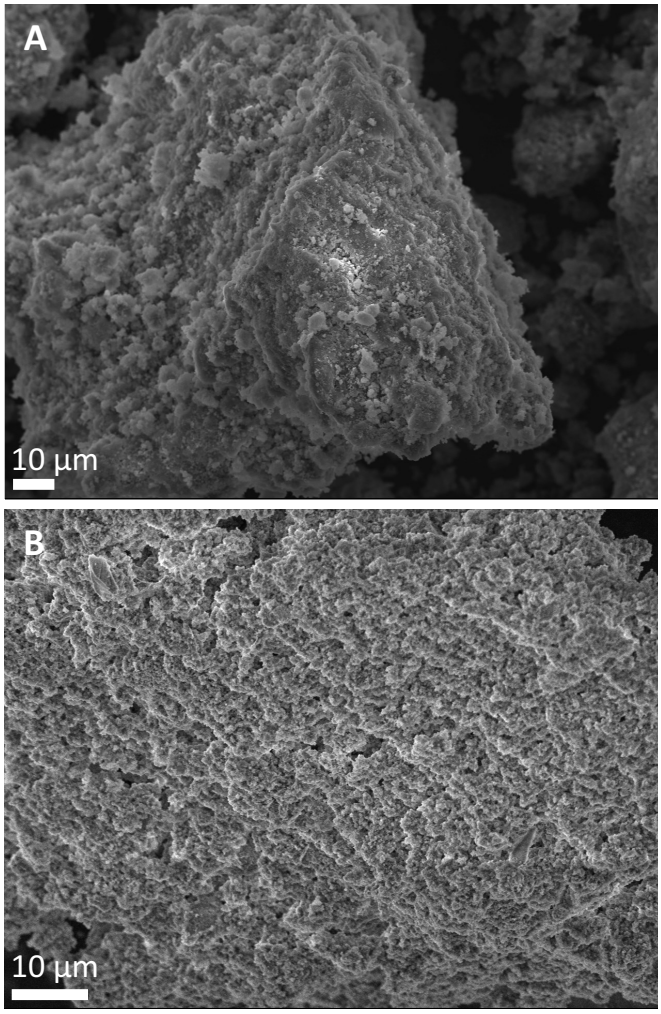

*Figure S7. Additional SEM images of **1C** (A) and **1** (B).*

Figure S8. Experimental setup for hydrogen evolution catalysis runs