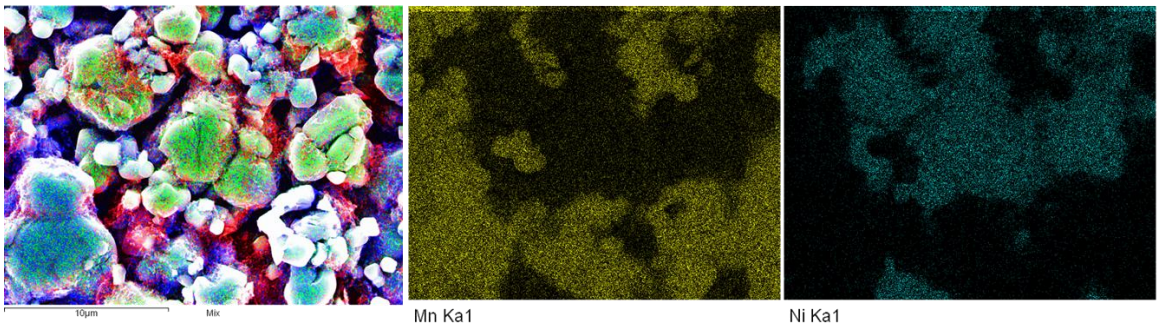
Supplementary Data

Supplementary S1. Analysis of Cathode Black Mass

From the EDX data is observed that there are two distinct phases in the cathode, the first is manganese rich, and the second is nickel rich with cobalt. There appears to be no manganese in the nickel phase (Figure S1. 1). Using the ICP-OES data of the QC reject full cathode (with aluminium current collector) was performed in order to extract the ratio of transition metals present (Table S1. 1). We can calculate the ratio of the two phases $LiMn_2O_4$ (LMO) and $Ni_{0.85}Co_{0.1}Al_{0.05}O_2$ (NCA), and the active mass content of the electrode. The ratio by mass of Mn:Co:Ni is 75Mn:2.86Co:22.5Ni this translates to a molar ratio of 0.76Mn0.03Co0.21Ni. We can therefore calculate the molar ratio of NCA to LMO to be 0.39NCA:0.61LMO and mass ratio 24.4NCA:75.5LMO.



(**a**) (**b**) (**c**)

Figure S1. 1 EDX mapping analysis showing distribution of the elements (**a**), the transition metals Mn (**b**) and Ni (**c**) in the SEM images, there appear to be two separate phases the first is Mn rich, the second is Ni rich.

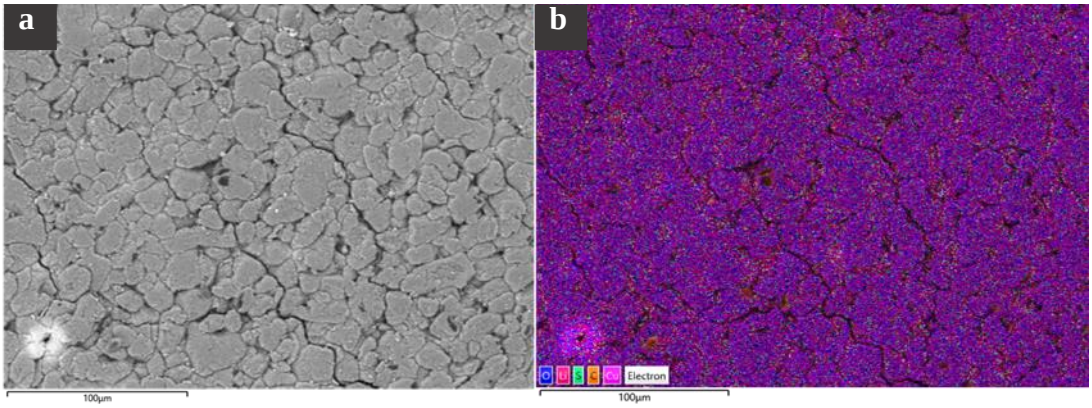
Table S1. 1 ICP-OES analysis of the extracted cathode electrode, washed with distilled water, not delaminated.

Li	Cu	Ni	Al	Mn	Co	Undissolved	Unmeasured	Total
3.3%	0.3%	10.4%	7.8%	34.6%	1.3%	6.7%	35.6%	100.0%

Table S1. 2. EDX analysis of the elemental composition of the QC reject and EOL after washing and delamination.

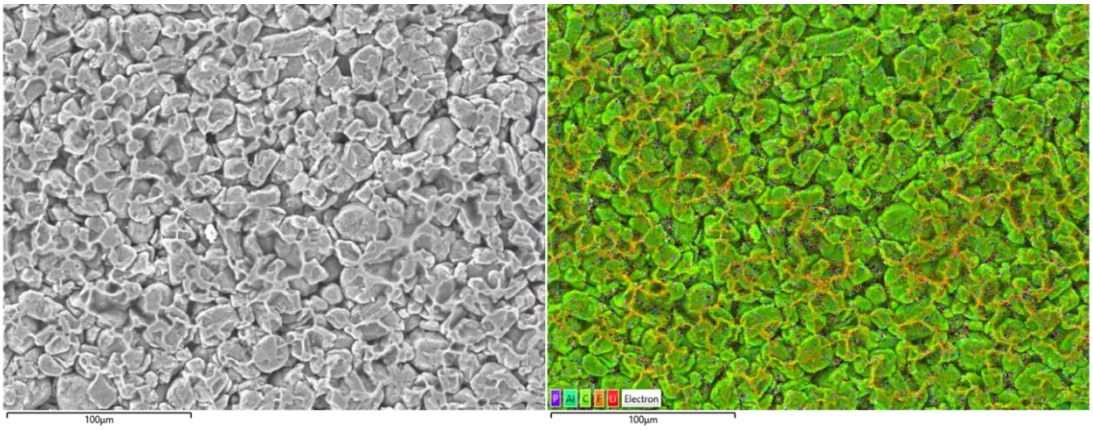
Element	F	Al	Mn	Co	Ni	Cu
QC Reject Weight, %	8.71	1.23	65.36	2.63	20.49	1.58
EOL Weight, %	4.82	1.01	68.55	5.23	20.39	0.00

Supplementary S2. Analysis of Anode Black Mass



(**a**) (**b**)

Figure S2. 1 SEM (**a**) and EDS elemental mapping (**b**) of QC rejected anode, showing copper contamination throughout the electrode.



(**a**) (**b**)

Figure S2. 2 SEM (**a**) and EDS elemental mapping (**b**) of EOL cell, showing carbon particles and patches of high fluorine content due to the PVDF binder.

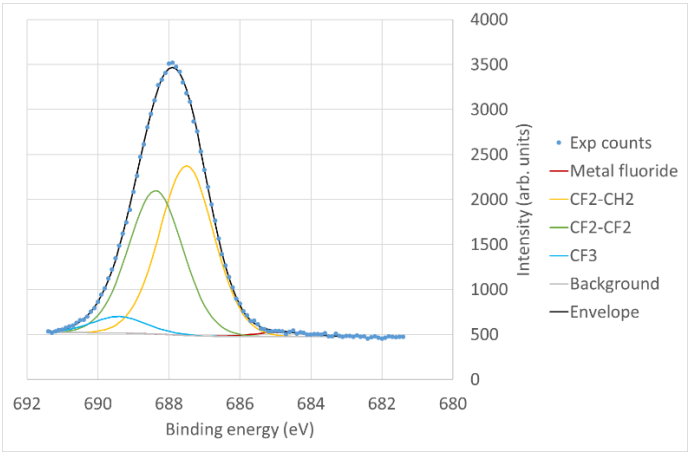


Figure S2. 3 XPS analysis of the surface of the QC rejected anode black mass, and the fluorine analysis.

Table S2. 1 Elemental composition analysed by EDX of the anode black mass with different treatments and positions within the cell, C–closest to current collector, S–closest to separator.

Cell	**End of Life Cell (EOL)**					**QC Reject Cell**					
Treatment	**IPA washed**		**H_2O washed**		**Unwashed**	**IPA washed**		**H_2O washed**		**Unwashed**	
Element	**C**	**S**	**C**	**S**	**C**	**C**	**S**	**C**	**S**	**C**	**S**
F	2.5(1)	19.7(3)	2.07(8)	13.3(1)	2.41(7)	2.4(1)	10.2(1)	2.82(9)	10.5(1)	6.8(6)	9.0(2)
C	97.1(2)	73.1(4)	97.1(1)	86.1(1)	97.1(1)	96.8(2)	87.4(1)	96.5(1)	87.4(1)	71(1)	55.5(2)
Al	0.04(2)	0.11(3)	0.06(2)	0.25(1)	0.26(1)	0.05(2)	0.64(2)	0.04(2)	0.09(1)	2.0(1)	0.01(2)
S	0.11(3)	0.82(5)	0.15(2)	0.08(1)	0.09(1)	0.19(3)	0.19(1)	0.18(2)	0.17(2)	0.11(9)	0.12(2)
P	0.05(3)	0.07(4)	0.06(2)	0.07(1)	0.06(1)	0.02(2)	0.04(1)	0.03(2)	0.03(1)	0.08(8)	0.08(2)
Cu	-	-	-	-	-	0.6(1)	1.45(8)	0.47(8)	1.76(8)	4.7(6)	15.1(2)
O	-	-	-	-	-	-	-	-	-	15.1(8)	20.1(2)