Supplementary information

Table S1. Summary of the testing protocol used to cycle the pouch cells. Constant current (CC) and constant voltage (CV) phases are specified in the description of the charge conditions and finalization criteria.

Experiment	Cycle number	Discharge C-rate	Discharge finalization criteria	Charge conditions	Charge finalization criteria
Formation	0	0.05C	V = 2.8 V	CC: 0.05C CV: 4.2 V	CC: 4.2 V CV: 0.025C
Rate-capability	1-3	0.1C	V = 2.8 V	CC: 0.1C CV: 4.2 V	CC: 4.2 V CV: 0.05C
	4-6	0.33C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
	7-9	0.5C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
	10-12	1C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
	13	0.33C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
	14-16	2C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
Cycling	17	0.33C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
	18-26	1C	V = 2.8 V	CC: 0.33C CV: 4.2 V	CC: 4.2 V CV: 0.1C
	Loop to cycle 17 until 80% SOH				

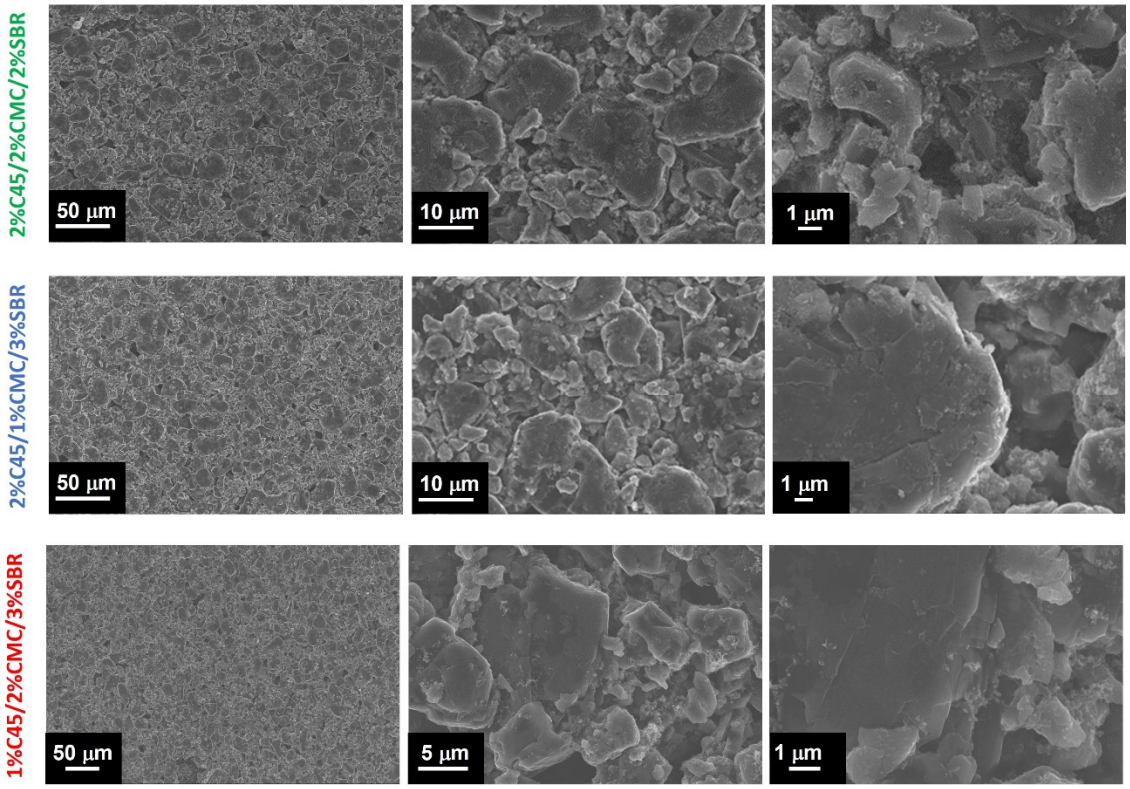

Figure S1. FE-SEM images of the (a-c) C2/D2/B2, (d-f) C2/D1/B3, and (g-i) C2/D1/B3 electrodes under different magnifications.

Table S2. Summary of the results of the different experiments to evaluate the performance of the anodes with different electrochemically inactive component fractions.

Formulation	Peel strength	Dispersion	Lithiation/delithiation capacity	First cycle efficiency
C2/D2/B2	Lowest	Acceptable	Acceptable	Lowest
C1/D2/B3	Highest	Acceptable	Lowest	Intermediate
C2/D1/B3	Acceptable	Acceptable	Acceptable	Highest

Table S3. Peel test results for the coatings with and without SWCNT.

Material	Adhesion strength (N/m)
No SWCNTs	9.2 ± 2.7
SWCNTs Tuball 0.4%	17.3 ± 1.3

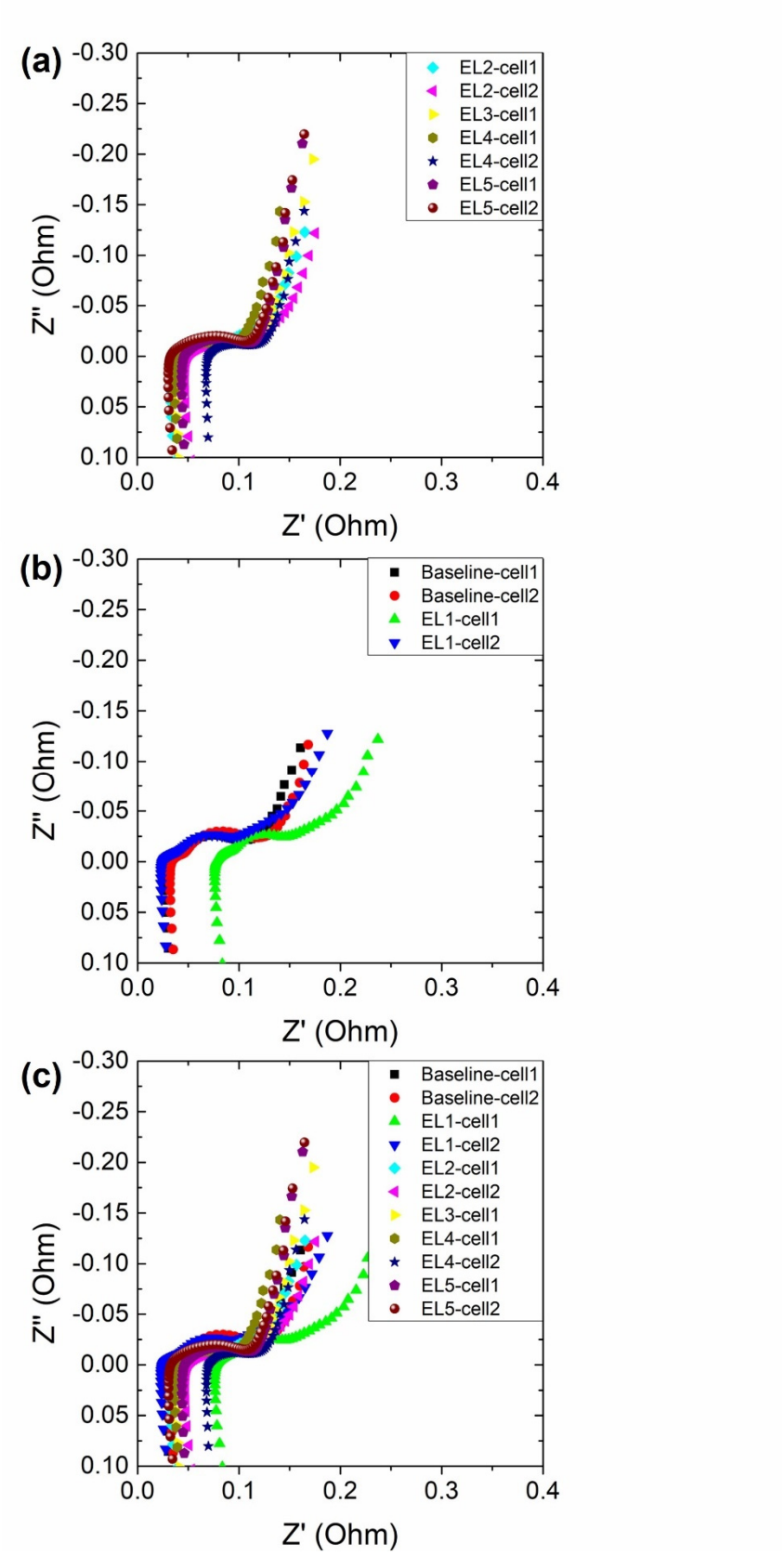

Figure S2. Nyquist diagrams obtained by the end of life of the cells. (a) All the cells, (b) only the cells with EL1 and the Baseline electrolyte, and (c) only the cells with the electrolytes EL2, EL3, EL4, and EL5.

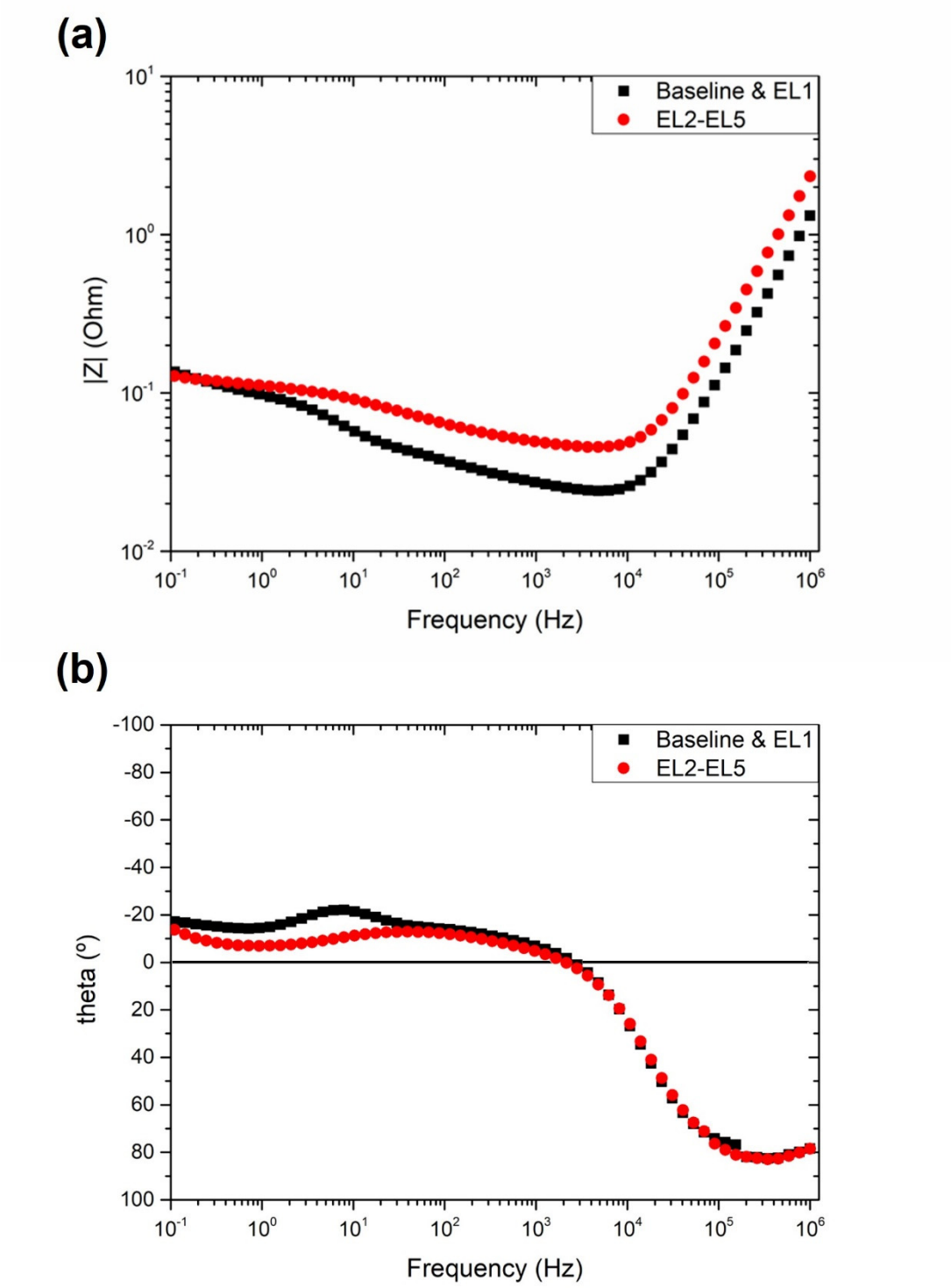

Figure S3. Examples of Bode diagrams obtained by the end of life of the cells with Baseline and EL1 electrolytes (black dots) and EL2-EL5 electrolytes (red dots).