Appendix:

Parameters

		Value	Standard Error	t-Value	Prob>|t|
Cap. Retention(%)	Intercept	99.44175	0.00874	11377.06679	0
	B1	-0.0011	8.07321E-6	-136.84005	0
	B2	1.96723E-7	2.34483E-9	83.89639	0
	B3	-2.02664E-11	2.93573E-13	-69.03381	0
	B4	1.09602E-15	1.7799E-17	61.57749	0
	B5	-2.90662E-20	5.15173E-22	-56.42022	0
	B6	2.95352E-25	5.70404E-27	51.77943	0

Standard Error was scaled with square root of reduced Chi-Sqr.

Statistics

	Cap. Retention(%)
Number of Points	30000
Degrees of Freedom	29993
Residual Sum of Squares	1401.76277
R-Square (COD)	0.97402
Adj. R-Square	0.97402

Figure S1. Sixth-Order Polynomial Fit of Capacity Retention for SC1 under CCCD1 Conditions

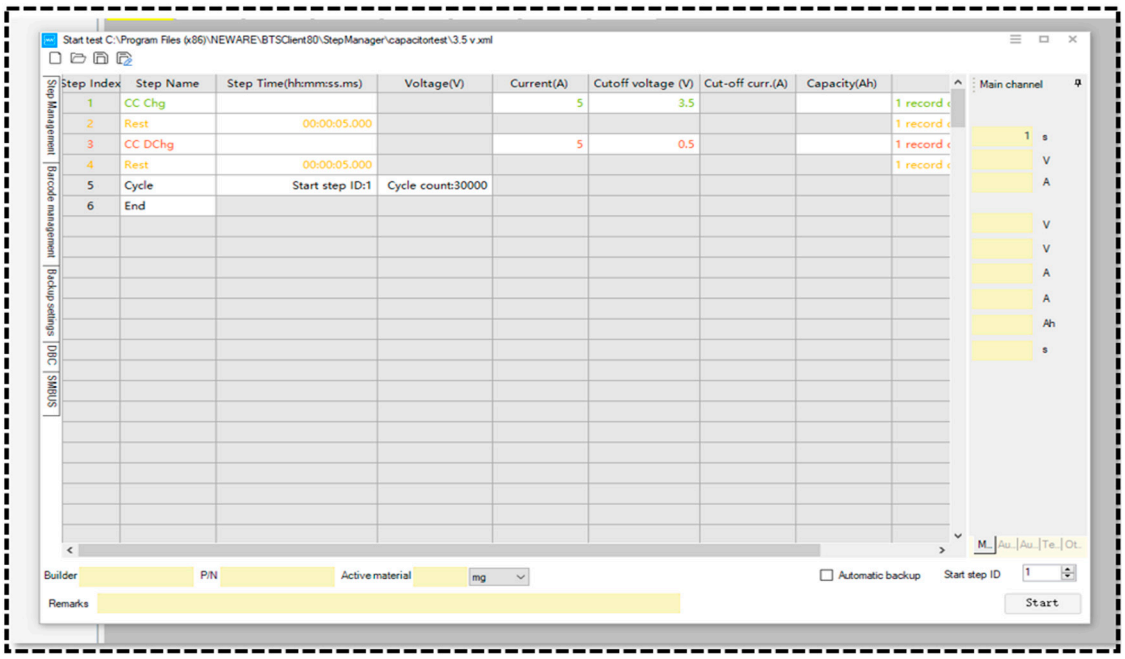


Figure S2. Battery cycler parameters PC settings for CCCD2

Table S1. Summary of CCCD Test Protocols Parameters Used in Supercapacitor Cycling

Protocol	Current (A)	Upper Voltage (V)	Lower Voltage (V)	Test step time (s)	Cycle Count.
CCCD1	5	2.6	0.5	10	30000
CCCD2	5	3.5	0.5	10	30000

CCCD3	3	3.5	0.5	10	30000

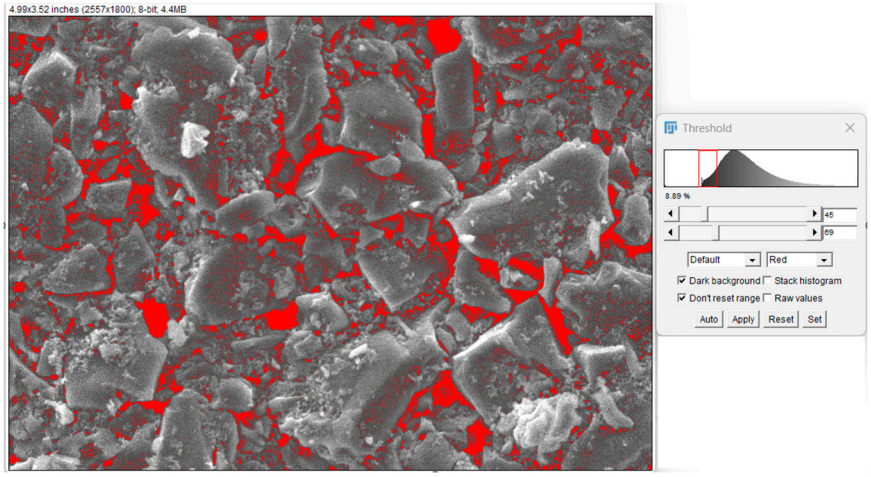
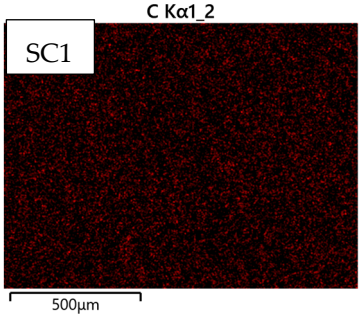
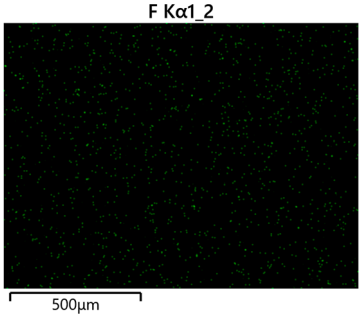
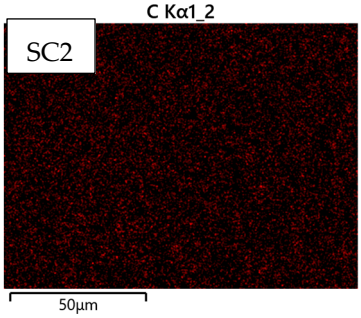


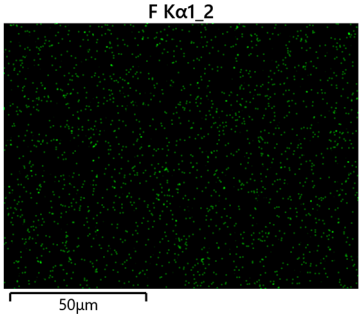
Figure S3. Threshold Segmentation in ImageJ for Porosity Analysis



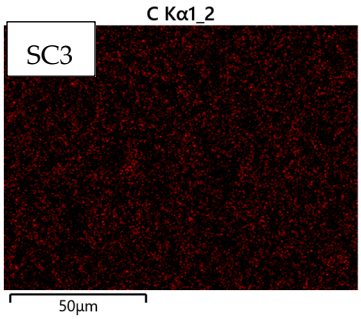


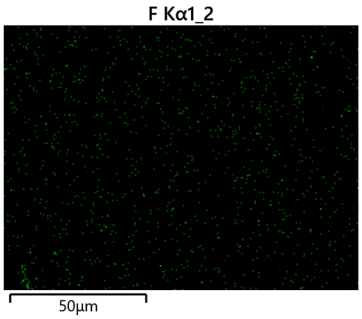
Map Spectrum		
Element	Weight (%)	σ
C	91.5	0.4
F	8.5	0.4



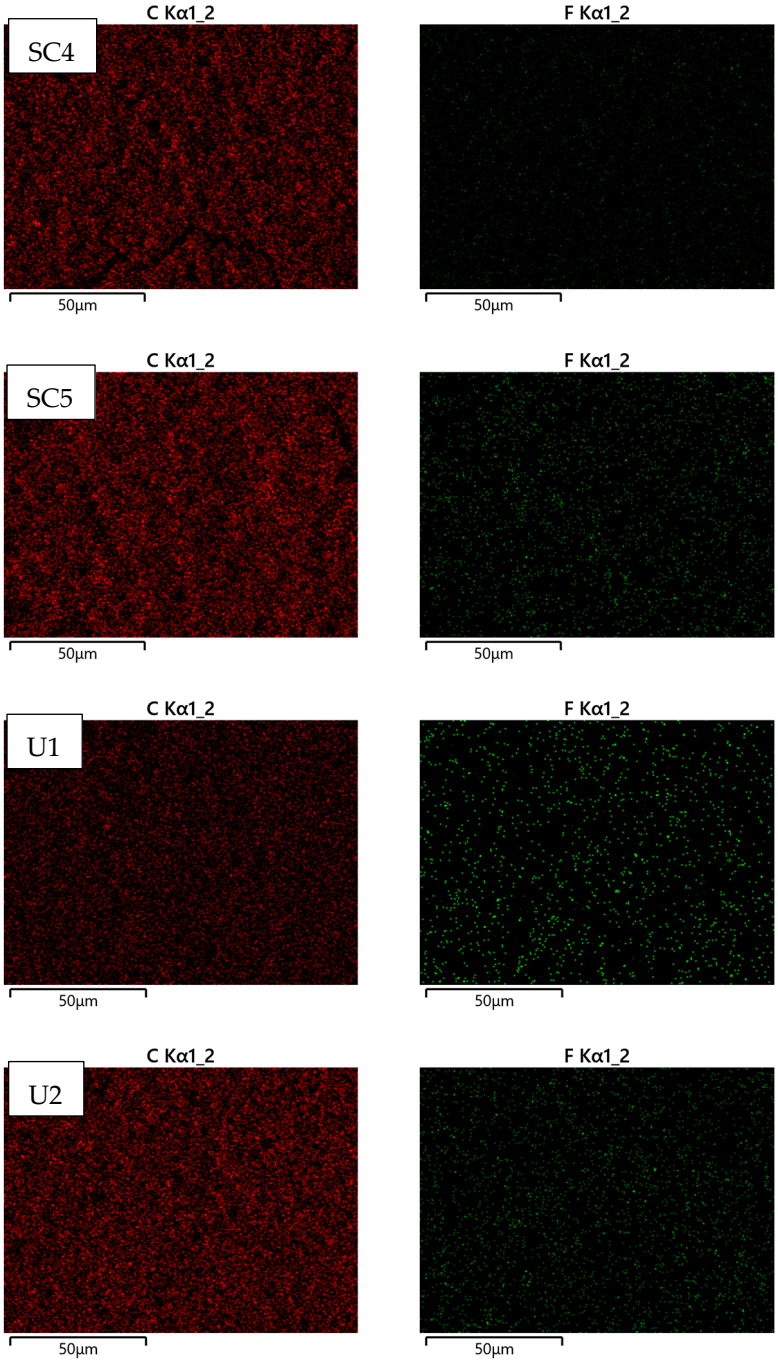


Map Spectrum		
Element	Weight (%)	σ
C	86.7	0.5
F	13.1	0.4





Map Spectrum		
Element	Weight (%)	σ
C	90.5	0.5
F	9.2	0.4



Map Spectrum		
Element	Weight (%)	σ
C	86.4	0.3
F	13.6	0.3

Map Spectrum		
Element	Weight (%)	σ
C	90.2	0.3
F	9.7	0.3

Map Spectrum		
Element	Weight (%)	σ
C	91.2	0.4
F	8.7	0.4

Map Spectrum		
Element	Weight (%)	σ
C	89.8	0.3
F	10.2	0.3

Figure S4. EDS Layered Images for all supercapacitors

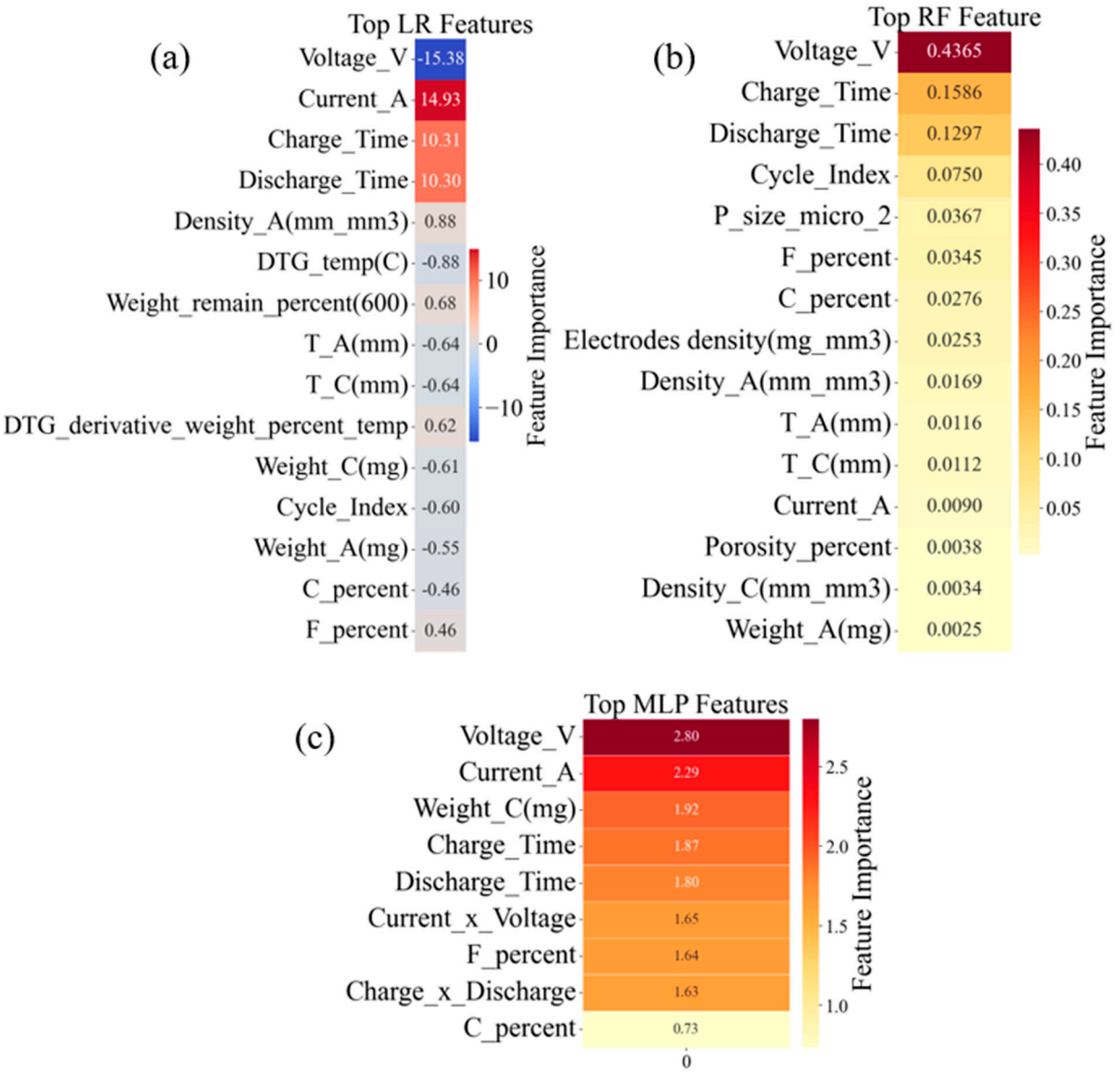


Figure S5. Feature importance for all Machine Learning Models (a): Linear Regression, (b): Random Forest, (c): MLP