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Nickel Cobalt Phosphate/Phosphide as Promising Electrode Materials for Extrinsic Supercapacitors

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Figure:



Fig. S1 Machine learning analysis of Supercapacitor behavior of nickel cobalt phosphate material: (A) Box plot of specific capacitance versus synthesis method for 2D materials, (B) Box plot of specific capacitance versus synthesis method for 3D materials, Scattered plot of (C) surface area versus annealing time, (D) pore size versus stability, (E) Ni precursors versus solvent, (F) Co precursors versus solvent, (G) Pore size versus electrolyte.

																			1.0
÷	Ni Precursor (mM) -	1.00	0.99	-0.02	0.48	-0.55	-0.05	-0.14	0.04	-0.10	-0.22	-0.09	0.07	0.29	-0.05	0.20	-0.05		
Parameters	Co Precursors (mM) -	0.99	1.00	-0.05	0.44	-0.53	-0.04	-0.09	0.03	-0.09		-0.09	0.05	0.29	0.01	0.22	-0.02		
	Other Precursors (mM) -	-0.02	-0.05	1.00	-0.29	-0.18	-0.01	0.01	0.02	-0.26		0.07	-0.00	-0.25	0.01	-0.20	-0.01		- 0.8
	Phpsphate Precursors (mM) -	0.48	0.44	-0.29	1.00	-0.18	-0.12	-0.38	0.06	0.33	-0.28	-0.30	-0.21	0.25	-0.31	-0.13	0.01		
	Solvent (ml) -	-0.55	-0.53	-0.18	-0.18	1.00	0.15	-0.03	-0.32	0.25	-0.10	-0.14	-0.05	-0.13	-0.09	-0.06	-0.05	- 0	- 0.6
	Reaction Temperature (°C) -	-0.05	-0.04	-0.01	-0.12	0.15	1.00	0.22	0.15	-0.26	-0.12	0.36	0.29	0.35	-0.12	-0.26	-0.10		
	Reaction Time (hr) -	-0.14	-0.09	0.01	-0.38	-0.03	0.22	1.00	0.08	-0.31	0.24	0.13	0.16	-0.06	0.36	0.10	-0.26	- 1	0.4
	Annealing Temperature (°C) -	0.04	0.03	0.02	0.06	-0.32	0.15	0.08	1.00	-0.16	-0.07	0.37	0.12	0.03	0.28	0.08	0.04		
	Annealing Time (hr) -	-0.10	-0.09	-0.26	0.33	0.25	-0.26	-0.31	-0.16	1.00	-0.23	-0.35	-0.30	-0.49	-0.20	-0.09	0.54	-	- 0.2
	Specific Capacitance (F/g) -	-0.22	-0.20	-0.20	-0.28	-0.10	-0.12	0.24	-0.07	-0.23	1.00	0.45	0.02	0.18	0.16	0.22	-0.18		
	Current density (A/g) -	-0.09	-0.09	0.07	-0.30	-0.14	0.36	0.13	0.37	-0.35	0.45	1.00	0.30	0.12	-0.03	0.16	-0.03		- 0.0
	Stability (%) -	0.07	0.05	-0.00	-0.21	-0.05	0.29	0.16	0.12	-0.30	0.02	0.30	1.00	0.12	0.24	0.58	-0.01		
	Number of Cycles -	0.29	0.29	-0.25	0.25	-0.13	0.35	-0.06	0.03	-0.49	0.18	0.12	0.12	1.00	-0.11	-0.08	-0.43		0.2
	Electrolyte (M) -	-0.05	0.01	0.01	-0.31	-0.09	-0.12	0.36	0.28	-0.20	0.16	-0.03	0.24	-0.11	1.00	0.50	0.07		
2	Pore Size (nm) -	0.20	0.22	-0.20	-0.13	-0.06	-0.26	0.10	0.08	-0.09	0.22	0.16	0.58	-0.08	0.50	1.00	-0.08	-	0.4
	Surface Area (m ² /g) -	-0.05	-0.02	-0.01	0.01	-0.05	-0.10	-0.26	0.04	0.54	-0.18	-0.03	-0.01	-0.43	0.07	-0.08	1.00		
NI Precursor (mM) (mM) (mM) (mM) (mM) (mM) (mM) (mM)																			

Fig. S2 Heatmap of correlation coefficients for features.



Fig. S3 Machine learning analysis of Supercapacitor behavior of nickel cobalt phosphide material: (A) Box plot of specific capacitance versus synthesis method for 1D materials, (B) Box plot of specific capacitance versus synthesis method for 2D materials, (C) Box plot of specific capacitance versus synthesis method for 3D materials.