

SUPPLEMENTARY MATERIAL

Ab initio investigation of the stability of electrolyte/electrode interfaces in all-solid-state Na batteries

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FIG. S1: The anodic voltage difference ΔV between Li and Na halides as a function of the anion radius (pm).

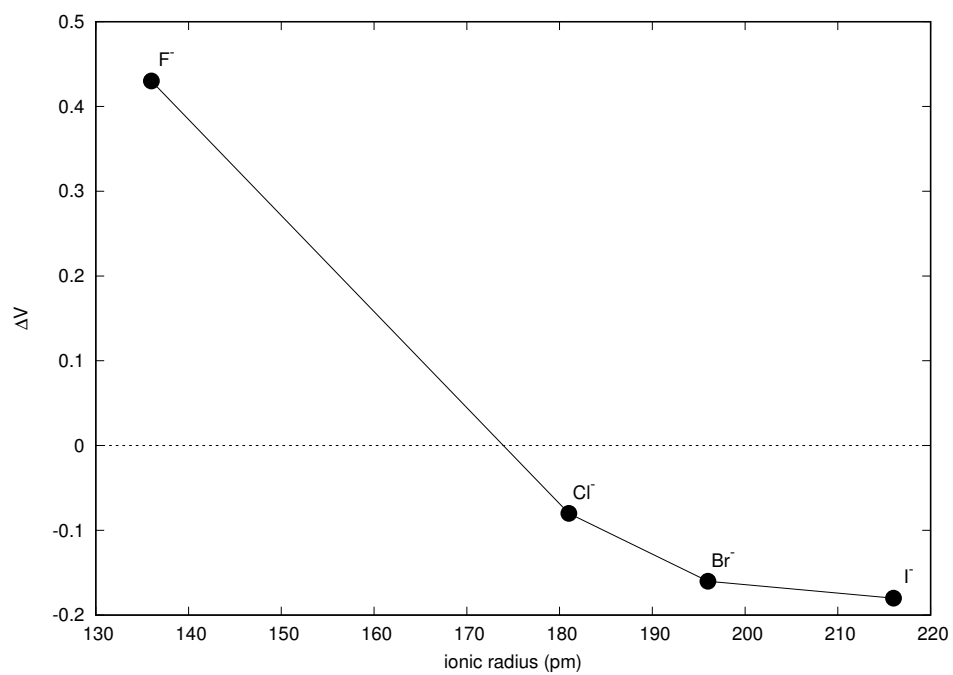


FIG. S2: Driving force for the decomposition of the solid-state NaSICON electrolytes $\text{NaZr}_2(\text{PO}_4)_3$ (red), $\text{NaTi}_2(\text{PO}_4)_3$ (blue), $\text{Na}_4\text{Zr}_2(\text{SiO}_4)_3$ (green) with varying voltage *vs.* Na metal.

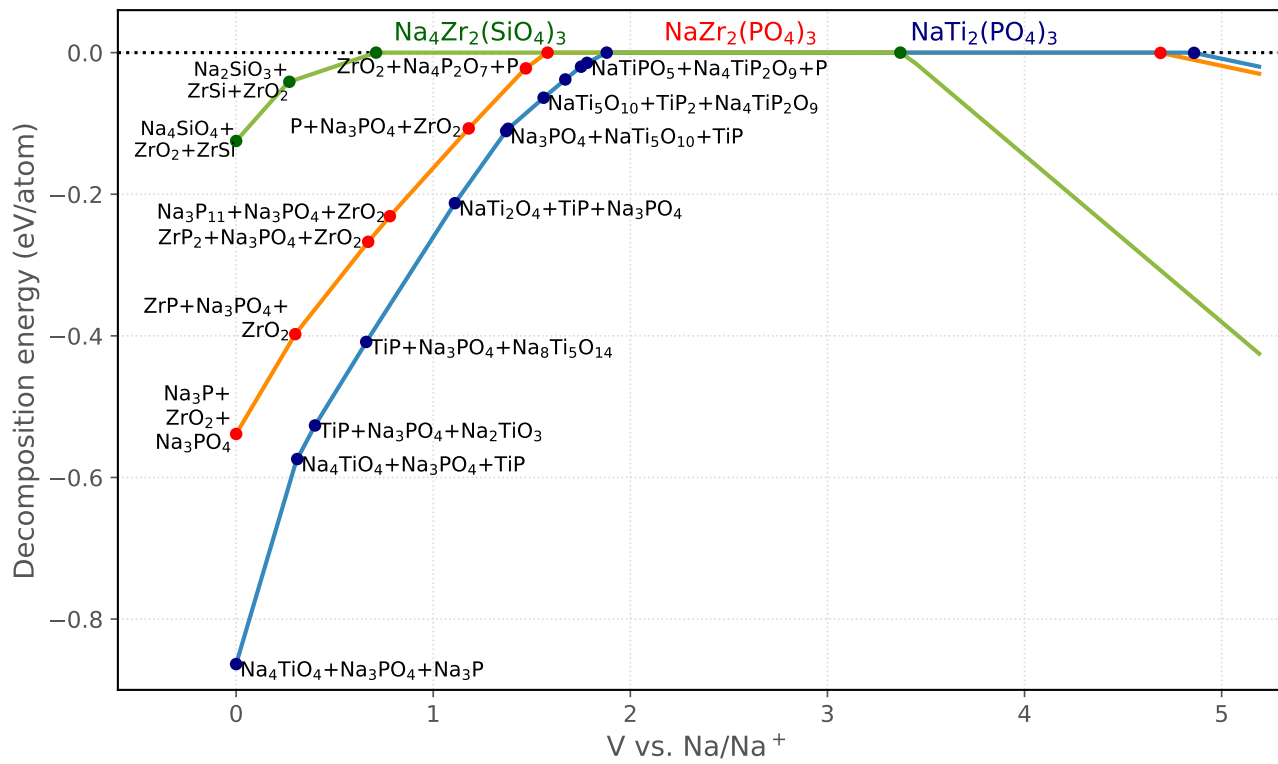


FIG. S3: Electrochemical stability windows calculated for selected Na and Li solid-state electrolyte candidates.

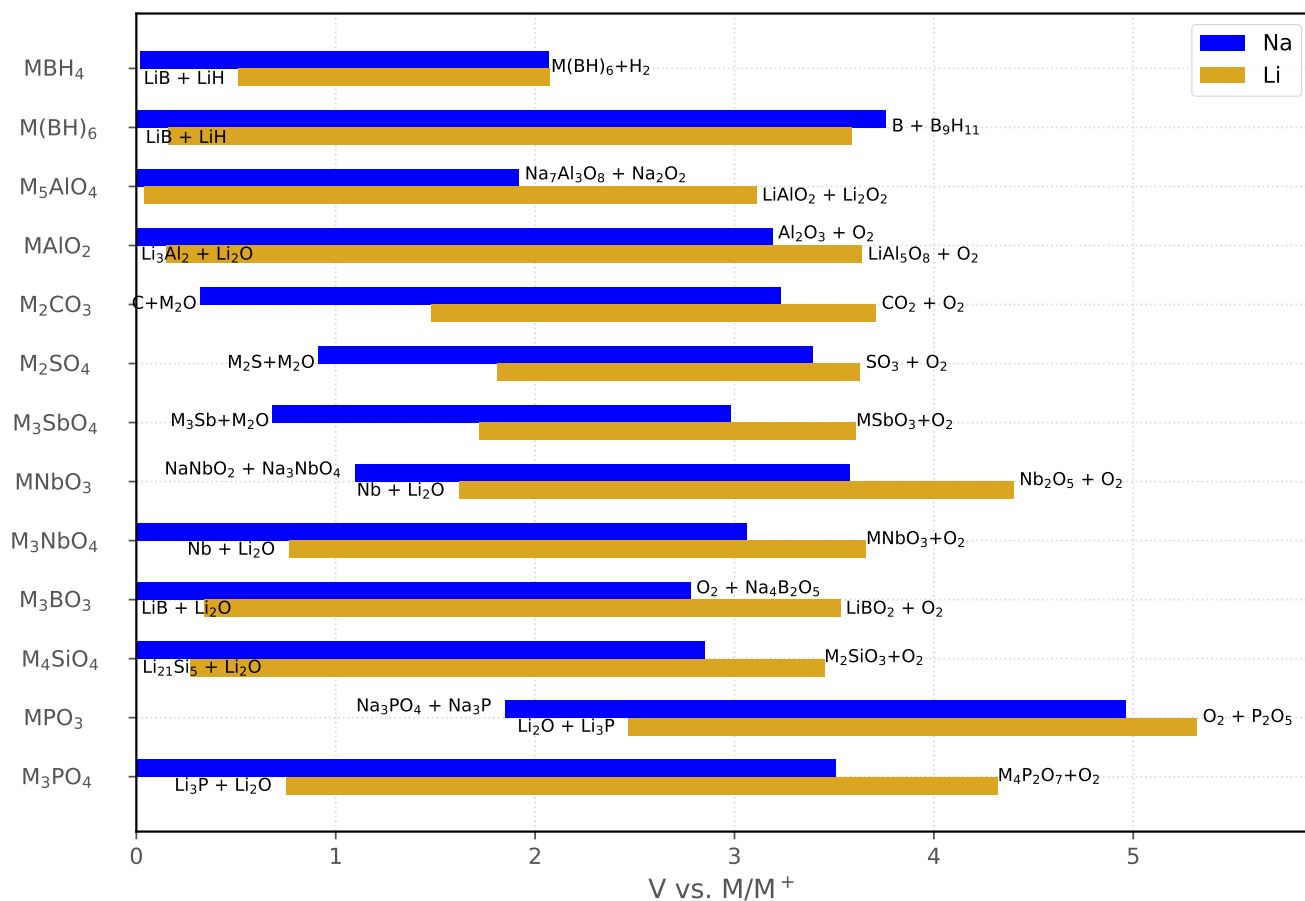


TABLE S1: Predicted reactions for the electrolytes of Figure 2 at their voltage stability limits (V *vs.* Na/Na⁺). Phase equilibria with Na metal and corresponding decomposition energies (ΔE , eV/atom) are also reported. Columns SG and ICSD report the space group numbers of the calculated DFT ground-state structures and collection codes of the originating ICSD records, respectively.

	SG	ICSD	Reduction <i>vs.</i> Na metal		Cathodic reaction		Anodic reaction	
			ΔE		V	Products	V	Products
Na ₃ PSe ₄	217	196132	1.77	Na ₃ P + Na ₂ Se	1.57	Na ₂ PSe ₃ + Na ₂ Se	1.87	Se + Na ₂ PSe ₃
Na ₄ SiS ₄ ^a	218	-	0.82	NaSi + Na ₂ S	1.02	Na ₂ S + Si	2.17	Na ₂ Si ₂ S ₅ + S
Na ₃ PS ₄	114	72860	1.68	Na ₂ S + Na ₃ P	1.39	Na ₂ S + P	2.45	P ₂ S ₅ + S
Na ₁₀ SnP ₂ S ₁₂ ^b	21	-	1.51	Na ₂ S + Na ₃ P + Na ₁₅ Sn ₄	1.37	Na ₂ S + Na ₄ SnS ₄ + P	2.23	SnS ₂ + Na ₃ PS ₄ + S
Na ₃ SbS ₄	114	431205	1.92	Na ₃ Sb + Na ₂ S	1.83	NaSbS ₂ + Na ₂ S	1.90	NaSbS ₂ + NaS ₂
NaPO ₃	62	18139	0.64	Na ₃ PO ₄ + Na ₃ P	2.02	Na ₅ P ₃ O ₁₀ + P	4.86	P ₂ O ₅ + O ₂
NaNbO ₃	161	9645	0.30	NaNbO ₂ + Na ₃ NbO ₄	1.20	NaNbO ₂ + Na ₃ NbO ₄	3.48	Nb ₂ O ₅ + O ₂
Na ₂ SO ₄	63	31687	1.35	Na ₂ O + Na ₂ S	1.05	Na ₆ S ₂ O ₉ + Na ₂ S	3.33	SO ₃ + O ₂
Na ₂ CO ₃	12	281362	0.34	C + Na ₂ O	0.35	Na ₂ O + C	3.18	CO ₂ + O ₂
Na ₃ SbO ₄	13	10320	0.77	Na ₂ O + Na ₃ Sb	0.77	Na ₅ SbO ₅ + Na ₃ SbO ₃	2.91	NaSbO ₃ + O ₂
Na ₃ NbO ₄	12	6116	-	-	-	-	3.00	NaNbO ₃ + O ₂
Na ₃ PO ₄	114	97205	-	-	-	-	3.39	Na ₄ P ₂ O ₇ + O ₂
Na ₃ BO ₃	14	1351	-	-	-	-	2.68	Na ₄ B ₂ O ₅ + NaO ₂
Na ₄ SiO ₄	2	15500	-	-	-	-	2.78	Na ₂ SiO ₃ + O ₂
NaTi ₂ (PO ₄) ₃	167	203039	0.86	Na ₄ TiO ₄ + Na ₃ PO ₄ + Na ₃ P	1.88	NaTiPO ₅ + Na ₄ TiP ₂ O ₉ + P	4.85	TiP ₂ O ₇ + TiO ₂ + O ₂
NaZr ₂ (PO ₄) ₃	167	9546	0.54	Na ₂ ZrO ₃ + Na ₃ P + Na ₃ PO ₄	1.58	Na ₄ P ₂ O ₇ + ZrO ₂ + P	4.68	Zr ₂ P ₂ O ₉ + ZrP ₂ O ₇ + O ₂
Na ₃ Zr ₂ (SiO ₄) ₂ PO ₄	15	473	0.35	Na ₄ SiO ₄ + ZrO ₂ + Na ₃ P	1.11	Na ₃ PO ₄ + Na ₃ P ₁₁ + ZrO ₂ + Na ₂ SiO ₃	3.64	ZrSiO ₄ + SiO ₂ + NaZr ₂ (PO ₄) ₃ + O ₂
Na ₄ Zr ₂ (SiO ₄) ₃	167	15545	0.15	Na ₄ SiO ₄ + ZrO ₂ + ZrSi	0.69	Na ₂ SiO ₃ + ZrSi + ZrO ₂	3.38	Na ₂ ZrSi ₄ O ₁₁ + ZrSiO ₄ + O ₂
NaAl ₁₁ O ₁₇	194	34905	0.06	Al + NaAlO ₂	0.14	NaAlO ₂ + Al	3.79	Al ₂ O ₃ + O ₂
NaAlO ₂	33	79404	-	-	-	-	3.11	Al ₂ O ₃ + O ₂
Na ₇ Al ₃ O ₈	2	26405	-	-	-	-	2.05	Na ₂ O ₂ + NaAlO ₂
Na ₁₇ Al ₅ O ₁₆	8	201541	-	-	-	-	2.07	Na ₂ O ₂ + NaAlO ₂
Na ₅ AlO ₄	61	26406	-	-	-	-	1.75	Na ₂ O ₂ + Na ₁₄ Al ₄ O ₁₃
Na ₃ OBr	62	78891	-	-	-	-	1.79	Na ₂ O ₂ + NaBr
Na ₄ OI ₂	139	67112	-	-	-	-	1.66	NaIO ₃ + NaI
NaAlCl ₄	19	8117	1.06	NaCl + Al	1.78	Al + NaCl	4.42	Cl ₂ + AlCl ₃
Na ₅ Al ₃ F ₁₄	128	26419	0.30	NaF + Al	0.97	Al + Na ₃ AlF ₆	6.20	F ₂ + AlF ₃
Na ₃ AlF ₆	14	4029	0.20	NaF + Al	0.46	Al + NaF	6.19	F ₂ + Na ₅ Al ₃ F ₁₄
Na ₂ B ₁₂ H ₁₂	14	164649	-	-	-	-	3.46	B ₉ H ₁₁ + B
NaBH ₄	137	167235	0.03	Na(BH) ₆ + NaH	0.08	Na(BH) ₆ + NaH	1.92	Na(BH) ₆ + H ₂

^a Unknown crystal structure, computed structure generated via data-mined substitution as in [*Inorg. Chem.* **50**, 2011, 656].

^b Structure from Ref. [*Nature Commun.* **7**, 2016, 11009].

TABLE S2: Reaction energies (eV/atom) between electrolytes and fully discharged cathodes

	NaCrO ₂	NaMnO ₂	NaFeO ₂	NaCoO ₂	NaNiO ₂	Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ V ₂ P ₂ O ₁₀ F
Na ₃ PSe ₄	-0.121	-0.229	-0.251	-0.353	-0.440	-0.089	-0.089
Na ₄ SiS ₄	-0.087	-0.130	-0.230	-0.294	-0.372	-0.100	-0.100
Na ₃ PS ₄	-0.093	-0.140	-0.255	-0.342	-0.427	-0.055	-0.055
Na ₁₀ SnP ₂ S ₁₂	-0.072	-0.115	-0.199	-0.276	-0.359	-0.051	-0.051
Na ₃ SbS ₄	-0.004	-0.050	-0.077	-0.151	-0.274	-0.054	-0.054
NaPO ₃	-0.062	-0.077	-0.095	-0.081	-0.091	-0.000	-0.000
NaNbO ₃	-0.000	-0.000	-0.007	-0.009	-0.008	-0.009	-0.009
Na ₂ SO ₄	-0.000	-0.000	-0.000	-0.000	-0.000	-0.033	-0.033
Na ₂ CO ₃	-0.000	-0.000	-0.000	-0.000	-0.000	-0.047	-0.047
Na ₃ SbO ₄	-0.000	-0.000	-0.000	-0.000	-0.000	-0.089	-0.089
Na ₃ NbO ₄	0.000	-0.000	-0.000	-0.000	-0.000	-0.065	-0.065
Na ₃ PO ₄	-0.000	-0.000	-0.000	-0.000	-0.000	-0.013	-0.013
Na ₃ BO ₃	-0.000	-0.000	-0.000	-0.000	-0.000	-0.116	-0.116
Na ₄ SiO ₄	-0.000	-0.000	-0.000	-0.000	-0.000	-0.092	-0.092
NaTi ₂ (PO ₄) ₃	-0.061	-0.075	-0.094	-0.082	-0.088	-0.000	-0.000

TABLE S2: Reaction energies (eV/atom) between electrolytes and fully discharged cathodes

	NaCrO ₂	NaMnO ₂	NaFeO ₂	NaCoO ₂	NaNiO ₂	Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ V ₂ P ₂ O ₁₀ F
NaZr ₂ (PO ₄) ₃	-0.037	-0.056	-0.077	-0.065	-0.065	-0.000	-0.000
Na ₃ Zr ₂ Si ₂ PO ₁₂	-0.006	-0.022	-0.033	-0.030	-0.029	-0.008	-0.008
Na ₄ Zr ₂ (SiO ₄) ₃	-0.004	-0.014	-0.021	-0.020	-0.019	-0.019	-0.019
NaAl ₁₁ O ₁₇	-0.000	-0.009	-0.023	-0.021	-0.019	-0.016	-0.016
NaAlO ₂	-0.000	-0.000	-0.000	-0.000	-0.000	-0.049	-0.049
Na ₇ Al ₃ O ₈	-0.000	-0.000	-0.000	-0.013	-0.000	-0.156	-0.156
Na ₁₇ Al ₅ O ₁₆	-0.000	-0.000	-0.003	-0.022	-0.000	-0.200	-0.200
Na ₁₄ Al ₄ O ₁₃	-0.000	-0.000	-0.003	-0.023	-0.000	-0.203	-0.203
Na ₅ AlO ₄	-0.000	-0.001	-0.014	-0.035	-0.007	-0.236	-0.236
Na ₃ OBr	-0.000	-0.000	-0.024	-0.046	-0.010	-0.248	-0.248
Na ₄ OI ₂	-0.000	-0.000	-0.012	-0.032	-0.001	-0.200	-0.200
NaAlCl ₄	-0.243	-0.283	-0.284	-0.283	-0.337	-0.114	-0.114
Na ₅ Al ₃ F ₁₄	-0.044	-0.058	-0.078	-0.067	-0.069	-0.009	-0.009
Na ₃ AlF ₆	-0.020	-0.037	-0.053	-0.046	-0.047	-0.000	-0.000
Na ₂ B ₁₂ H ₁₂	-0.101	-0.238	-0.365	-0.535	-0.674	-0.208	-0.208
NaBH ₄	-0.000	-0.129	-0.237	-0.389	-0.513	-0.118	-0.118

TABLE S3: Predicted reaction energies (eV/atom) between electrolytes and half charged cathodes

	Na _{0.5} CrO ₂	Na _{0.5} MnO ₂	Na _{0.5} FeO ₂	Na _{0.5} CoO ₂	Na _{0.5} NiO ₂	Na _{1.5} V ₂ P ₂ O ₈ F ₃	Na _{1.5} V ₂ P ₂ O ₁₀ F
Na ₃ PSe ₄	-0.182	-0.286	-0.367	-0.424	-0.547	-0.111	-0.198
Na ₄ SiS ₄	-0.138	-0.189	-0.307	-0.373	-0.525	-0.140	-0.181
Na ₃ PS ₄	-0.144	-0.203	-0.353	-0.433	-0.584	-0.084	-0.156
Na ₁₀ SnP ₂ S ₁₂	-0.120	-0.181	-0.272	-0.360	-0.519	-0.089	-0.153
Na ₃ SbS ₄	-0.109	-0.137	-0.183	-0.252	-0.471	-0.102	-0.143
NaPO ₃	-0.025	-0.038	-0.070	-0.009	-0.072	-0.018	-0.001
NaNbO ₃	-0.000	-0.000	-0.004	-0.000	-0.000	-0.058	-0.066
Na ₂ SO ₄	-0.000	-0.000	-0.000	-0.000	-0.000	-0.087	-0.087
Na ₂ CO ₃	-0.002	-0.000	-0.000	-0.000	-0.000	-0.114	-0.116
Na ₃ SbO ₄	-0.031	-0.008	-0.004	-0.000	-0.002	-0.138	-0.138
Na ₃ NbO ₄	-0.022	-0.004	-0.000	-0.000	-0.001	-0.123	-0.126
Na ₃ PO ₄	-0.000	-0.000	-0.000	-0.000	-0.000	-0.054	-0.054
Na ₃ BO ₃	-0.053	-0.024	-0.022	-0.001	-0.013	-0.179	-0.183
Na ₄ SiO ₄	-0.043	-0.017	-0.015	-0.000	-0.007	-0.148	-0.151
NaTi ₂ (PO ₄) ₃	-0.019	-0.029	-0.067	-0.004	-0.061	-0.000	-0.000
NaZr ₂ (PO ₄) ₃	-0.011	-0.018	-0.052	-0.000	-0.037	-0.005	-0.001
Na ₃ Zr ₂ Si ₂ PO ₁₂	-0.002	-0.005	-0.025	-0.000	-0.007	-0.052	-0.060
Na ₄ Zr ₂ (SiO ₄) ₃	-0.002	-0.004	-0.017	-0.000	-0.006	-0.074	-0.082
NaAl ₁₁ O ₁₇	-0.003	-0.002	-0.016	-0.000	-0.004	-0.070	-0.077
NaAlO ₂	-0.009	-0.000	-0.000	-0.000	-0.000	-0.120	-0.120
Na ₇ Al ₃ O ₈	-0.087	-0.069	-0.065	-0.047	-0.051	-0.225	-0.231
Na ₁₇ Al ₅ O ₁₆	-0.104	-0.087	-0.083	-0.066	-0.065	-0.277	-0.284
Na ₁₄ Al ₄ O ₁₃	-0.105	-0.088	-0.084	-0.067	-0.066	-0.280	-0.287
Na ₅ AlO ₄	-0.119	-0.104	-0.100	-0.087	-0.080	-0.328	-0.334
Na ₃ OBr	-0.126	-0.113	-0.109	-0.099	-0.099	-0.340	-0.346
Na ₄ OI ₂	-0.108	-0.093	-0.123	-0.075	-0.135	-0.267	-0.272
NaAlCl ₄	-0.179	-0.207	-0.224	-0.217	-0.308	-0.121	-0.119
Na ₅ Al ₃ F ₁₄	-0.022	-0.026	-0.053	-0.010	-0.037	-0.000	-0.003
Na ₃ AlF ₆	-0.006	-0.010	-0.038	-0.000	-0.016	-0.001	-0.000
Na ₂ B ₁₂ H ₁₂	-0.217	-0.409	-0.570	-0.696	-0.885	-0.260	-0.334
NaBH ₄	-0.193	-0.317	-0.415	-0.525	-0.688	-0.185	-0.251

TABLE S4: Predicted interface reaction products between electrolytes and fully discharged cathodes

	NaCrO ₂	NaMnO ₂	NaFeO ₂	NaCoO ₂	NaNiO ₂	Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ V ₂ P ₂ O ₁₀ F
Na ₃ PSe ₄	Na ₃ PO ₄ + NaCrSe ₂	Na ₃ PO ₄ + MnSe ₂ + Na ₂ Mn ₂ Se ₃ + Na ₆ MnSe ₄	Na ₃ PO ₄ + FeSe ₂ + Na ₂ Se + FeSe	Na ₃ PO ₄ + Co ₃ Se ₄ + Na ₂ Se + NaSe	Na ₃ PO ₄ + Ni ₃ Se ₄ + Na ₂ Se + NaSe	Na ₂ PSe ₃ + Na ₅ P ₃ O ₁₀ + NaF + VSe ₂ + Na ₄ P ₂ O ₇ + V ₂ Se ₉	Na ₅ P ₃ O ₁₀ + VSe ₂ + Na ₄ P ₂ O ₇ + NaF + Na ₃ V ₂ P ₂ O ₈ F ₃ + V ₂ Se ₉
Na ₄ SiS ₄	NaCrS ₂ + Na ₂ SiO ₃ + Na ₂ S	Mn ₂ SiO ₄ + Na ₂ S + Na ₆ MnS ₄ + SO ₂ + MnO	Na ₂ SiO ₃ + Na ₅ FeS ₄ + Na ₃ (FeS ₂) ₂ + FeS ₂	Na ₂ SiO ₃ + Na ₂ S + Co ₉ S ₈ + Na ₂ SO ₄ + Na ₄ SiO ₄	Na ₂ SiO ₃ + Na ₂ S + Ni ₃ S ₂ + Na ₂ SO ₄ + Na ₄ SiO ₄	Na ₃ P(SO) ₂ + NaF + SiO ₂ + Na ₃ PSO ₃ + V ₃ S ₄ + Na ₃ VS ₄ + Na ₄ P ₂ O ₇	Na ₃ PSO ₃ + Na ₃ VS ₄ + SiO ₂ + NaF + V ₃ S ₄ + Na ₂ Si ₂ O ₅ + NaV(SiO ₃) ₂
Na ₃ PS ₄	Na ₃ PSO ₃ + NaCrS ₂ + Na ₃ PO ₄	Na ₆ MnS ₄ + NaMnPO ₄ + MnO + SO ₂ + NaS ₂	Na ₃ PO ₄ + Na ₃ (FeS ₂) ₂ + FeS ₂	Na ₃ PO ₄ + CoS ₂ + Na ₂ S + Co ₉ S ₈	Na ₃ PO ₄ + Ni ₃ S ₂ + Na ₂ SO ₄ + Na ₂ S + Ni ₉ S ₈	Na ₃ PS ₄ + Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ V ₂ (PO ₄) ₃ + Na ₄ P ₂ O ₇ + NaF + VS ₂ + VS ₄ + Na ₃ VS ₄
Na ₁₀ SnP ₂ S ₁₂	NaCrS ₂ + Na ₃ PO ₄ + Na ₄ SnS ₄ + Na ₃ PSO ₃	Na ₆ MnS ₄ + NaMnPO ₄ + Na ₄ SnS ₄ + MnO + SO ₂ + Na ₂ S	Na ₃ PO ₄ + Na ₃ (FeS ₂) ₂ + Na ₄ SnS ₄ + FeS ₂ + Na ₃ PSO ₃	Na ₃ PO ₄ + Co ₉ S ₈ + Na ₄ SnS ₄ + Na ₂ SO ₄ + Na ₂ S + Na ₂ SnO ₃	Na ₃ PO ₄ + Ni ₃ S ₂ + Na ₂ SO ₄ + Na ₂ S + Na ₂ SnO ₃ + Na ₄ SnS ₄	Na ₃ PS ₃ O + Na ₄ Sn ₃ S ₈ + NaF + V ₃ S ₄ + Na ₄ SnS ₄ + Na ₃ VS ₄ + Na ₄ P ₂ O ₇	Na ₃ V ₂ (PO ₄) ₃ + Na ₄ P ₂ O ₇ + NaF + VS ₄ + SnS ₂ + VS ₄ + VS ₂
Na ₃ SbS ₄	NaSbS ₂ + Na ₂ S + NaCrS ₂ + SO ₂ + NaCrO ₂	Na ₂ S + MnO + NaSbS ₂ + Na ₂ SO ₄	NaSbS ₂ + Na ₅ FeS ₄ + Na ₂ SO ₄ + Na ₃ (FeS ₂) ₂ + FeS ₂	Na ₃ SbO ₄ + Co ₉ S ₈ + Na ₂ SO ₄ + Na ₂ S + NaSbS ₂	Na ₂ SO ₄ + Na ₂ S + Ni ₅ Sb ₂ + Ni + Ni ₃ S ₂	NaSbS ₂ + Na ₃ VS ₄ + Na ₄ P ₂ O ₇ + NaF + SO ₂ + S + Na ₃ PSO ₃	NaSbS ₂ + Na ₃ VS ₄ + Na ₃ PO ₄ + Na ₄ P ₂ O ₇ + SO ₂ + NaF + Na ₃ V ₂ (PO ₄) ₃
NaPO ₃	Na ₄ P ₂ O ₇ + Cr ₂ O ₃ + Na ₃ PO ₄	Na ₃ PO ₄ + NaMnPO ₄ + NaMn ₃ O ₆	Na ₃ PO ₄ + Fe ₂ O ₃ + Na ₃ Fe(PO ₄) ₂	Na ₃ PO ₄ + Co ₃ O ₄ + Na(CoO ₂) ₂ + Na ₄ P ₂ O ₇	NaNiPO ₄ + Na ₃ PO ₄ + O ₂ + NiO	NaPO ₃ + Na ₃ V ₂ P ₂ O ₈ F ₃	NaPO ₃ + Na ₃ V ₂ P ₂ O ₁₀ F
NaNbO ₃	NaNbO ₃ + NaCrO ₂	NaNbO ₃ + NaMnO ₂	Na ₃ NbO ₄ + Fe ₂ O ₃ + NaNbO ₃	Na ₃ NbO ₄ + Na ₂ (CoO ₂) ₃ + Co ₃ O ₄ + NaNbO ₃	Na ₅ (NiO ₂) ₉ + Na ₃ NbO ₄ + NiO + NaNbO ₃	Na ₃ V ₂ (PO ₄) ₃ + Nb ₂ O ₅ + NaF + V ₂ O ₃ + NaNbO ₃	Na ₃ V ₂ (PO ₄) ₃ + NaVO ₃ + Nb ₂ O ₅ + Na ₄ P ₂ O ₇ + NaF + NaNb ₂ PO ₈
Na ₂ SO ₄	NaCrO ₂ + Na ₂ SO ₄	NaMnO ₂ + Na ₂ SO ₄	NaFeO ₂ + Na ₂ SO ₄	Na ₂ SO ₄ + NaCoO ₂	Na ₂ SO ₄ + NaNiO ₂	Na ₄ P ₂ O ₇ + NaVO ₃ + NaF + SO ₂ + SO ₃ + Na ₃ PO ₄	Na ₄ P ₂ O ₇ + NaVO ₃ + SO ₃ + SO ₂ + NaF + Na ₃ PO ₄
Na ₂ CO ₃	NaCrO ₂ + Na ₂ CO ₃	NaMnO ₂ + Na ₂ CO ₃	Na ₂ CO ₃ + NaFeO ₂	Na ₂ CO ₃ + NaCoO ₂	Na ₂ CO ₃ + NaNiO ₂	Na ₃ PO ₄ + CO ₂ + Na ₃ VO ₄ + NaF + C + Na ₂ V ₃ O ₇	Na ₃ PO ₄ + Na ₃ VO ₄ + CO ₂ + NaF + Na ₂ V ₃ O ₇ + C
Na ₃ SbO ₄	Na ₃ SbO ₄ + NaCrO ₂	NaMnO ₂ + Na ₃ SbO ₄	NaFeO ₂ + Na ₃ SbO ₄	NaCoO ₂ + Na ₃ SbO ₄	Na ₃ SbO ₄ + NaNiO ₂	NaSbO ₃ + Na ₃ VO ₄ + Na ₃ PO ₄ + NaF + Na ₂ Sb ₄ O ₇ + Na ₃ SbO ₄	NaSbO ₃ + Na ₃ PO ₄ + Na ₃ VO ₄ + NaF + Sb ₂ O ₃ + Na ₂ Sb ₄ O ₇
Na ₃ NbO ₄		Na ₃ NbO ₄ + NaMnO ₂	Na ₃ NbO ₄ + NaFeO ₂	NaCoO ₂ + Na ₃ NbO ₄	Na ₃ NbO ₄ + NaNiO ₂	NaNbO ₃ + Na ₃ PO ₄ + NaVO ₂ + NaF	NaNbO ₃ + Na ₃ PO ₄ + Na ₃ VO ₄ + NaVO ₂ + NaF
Na ₃ PO ₄	Na ₃ PO ₄ + NaCrO ₂	NaMnO ₂ + Na ₃ PO ₄	Na ₃ PO ₄ + NaFeO ₂	NaCoO ₂ + Na ₃ PO ₄	Na ₃ PO ₄ + NaNiO ₂	Na ₃ V ₂ (PO ₄) ₃ + NaF + Na ₃ PO ₄	Na ₄ P ₂ O ₇ + Na ₃ V ₂ (PO ₄) ₃ + NaVO ₃ + NaF
Na ₃ BO ₃	NaCrO ₂ + Na ₃ BO ₃	NaMnO ₂ + Na ₃ BO ₃	NaFeO ₂ + Na ₃ BO ₃	NaCoO ₂ + Na ₃ BO ₃	Na ₃ BO ₃ + NaNiO ₂	Na ₃ PO ₄ + NaBO ₂ + NaVO ₂ + NaF + Na ₄ B ₂ O ₅	Na ₃ PO ₄ + NaBO ₂ + Na ₃ VO ₄ + NaVO ₂ + NaF + Na ₄ B ₂ O ₅

TABLE S4: Predicted interface reaction products between electrolytes and fully discharged cathodes

	NaCrO ₂	NaMnO ₂	NaFeO ₂	NaCoO ₂	NaNiO ₂	Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ V ₂ P ₂ O ₁₀ F
Na ₄ SiO ₄	NaCrO ₂ + Na ₄ SiO ₄	NaMnO ₂ + Na ₄ SiO ₄	NaFeO ₂ + Na ₄ SiO ₄	Na ₄ SiO ₄ + NaCoO ₂	Na ₄ SiO ₄ + NaNiO ₂	Na ₂ SiO ₃ + Na ₃ PO ₄ + NaVO ₂ + NaF + V ₂ O ₃	Na ₂ SiO ₃ + Na ₃ PO ₄ + Na ₃ VO ₄ + NaVO ₂ + NaF + V ₂ O ₃
NaTi ₂ (PO ₄) ₃	Na ₄ TiP ₂ O ₉ + Cr ₂ O ₃ + TiO ₂ + Na ₂ Ti ₆ O ₁₃	Na ₄ TiP ₂ O ₉ + Mn ₃ O ₄ + NaMn ₃ O ₆ + TiO ₂ + Na ₂ Ti ₆ O ₁₃	Na ₄ TiP ₂ O ₉ + Fe ₂ O ₃ + Na ₄ Ti ₅ O ₁₂ + Na ₂ Ti ₆ O ₁₃	Na ₄ TiP ₂ O ₉ + Co ₃ O ₄ + Na(CoO ₂) ₂ + Na ₂ Ti ₆ O ₁₃ + Na ₄ Ti ₅ O ₁₂	NaNiPO ₄ + Na ₄ TiP ₂ O ₉ + TiNiO ₃ + O ₂ + Ti ₄ (Ni ₅ O ₈) ₃	NaTi ₂ (PO ₄) ₃ + Na ₃ V ₂ P ₂ O ₈ F ₃	NaTi ₂ (PO ₄) ₃ + Na ₃ V ₂ P ₂ O ₁₀ F
NaZr ₂ (PO ₄) ₃	Na ₃ PO ₄ + Cr ₂ O ₃ + ZrO ₂	Na ₃ PO ₄ + Mn ₃ O ₄ + NaMn ₃ O ₆ + ZrO ₂ + NaMnPO ₄	Na ₃ PO ₄ + Fe ₂ O ₃ + ZrO ₂	Na ₃ PO ₄ + Co ₃ O ₄ + Na(CoO ₂) ₂ + ZrO ₂ + Na ₂ (CoO ₂) ₃	Na ₃ PO ₄ + NiO + ZrO ₂ + O ₂	Na ₃ V ₂ P ₂ O ₈ F ₃ + NaZr ₂ (PO ₄) ₃	Na ₃ V ₂ P ₂ O ₁₀ F + NaZr ₂ (PO ₄) ₃
Na ₃ Zr ₂ Si ₂ PO ₁₂	Na ₂ SiO ₃ + Cr ₂ O ₃ + Na ₃ PO ₄ + ZrO ₂ + ZrSiO ₄	Na ₂ SiO ₃ + Mn ₃ O ₄ + Na ₃ PO ₄ + ZrO ₂ + Na ₂ Mn ₃ O ₇ + NaMn ₂ O ₄	Na ₂ SiO ₃ + Fe ₂ O ₃ + Na ₃ PO ₄ + ZrO ₂ + NaFeO ₂	Na ₂ SiO ₃ + Na ₂ (CoO ₂) ₃ + Na ₃ PO ₄ + Co ₃ O ₄ + ZrO ₂ + Na(CoO ₂) ₂	Na ₂ SiO ₃ + Na(NiO ₂) ₃ + Na ₃ PO ₄ + ZrO ₂ + NiO	Na ₃ V ₂ (PO ₄) ₃ + ZrSiO ₄ + NaF + Na ₃ PO ₄	ZrSiO ₄ + Na ₄ P ₂ O ₇ + Na ₃ V ₂ (PO ₄) ₃ + NaVO ₃ + NaF + NaZr ₂ (PO ₄) ₃ + SiO ₂
Na ₄ Zr ₂ (SiO ₄) ₃	Na ₂ SiO ₃ + ZrO ₂ + Cr ₂ O ₃ + NaCrO ₂	Na ₂ SiO ₃ + ZrO ₂ + Mn ₃ O ₄ + NaMn ₂ O ₄ + Na ₂ Mn ₃ O ₇	Na ₂ SiO ₃ + ZrO ₂ + Fe ₂ O ₃ + NaFeO ₂	Na ₂ SiO ₃ + ZrO ₂ + Na ₂ (CoO ₂) ₃ + Co ₃ O ₄ + Na(CoO ₂) ₂	Na ₂ SiO ₃ + Na ₅ (NiO ₂) ₉ + ZrO ₂ + NiO + Na(NiO ₂) ₃	Na ₃ V ₂ (PO ₄) ₃ + ZrSiO ₄ + NaF + NaV(SiO ₃) ₂ + V ₂ O ₃	Na ₃ V ₂ (PO ₄) ₃ + ZrSiO ₄ + Na ₄ P ₂ O ₇ + NaVO ₃ + NaV(SiO ₃) ₂ + NaF + Na ₃ PO ₄
NaAl ₁₁ O ₁₇	NaCrO ₂ + Al ₂ O ₃ + NaAlO ₂	NaAlO ₂ + Mn ₃ O ₄ + NaMn ₂ O ₄ + Na ₂ Mn ₃ O ₇	NaAlO ₂ + Fe ₂ O ₃ + NaFeO ₂	NaAlO ₂ + Na ₂ (CoO ₂) ₃ + Na(CoO ₂) ₂	NaAlO ₂ + Na ₅ (NiO ₂) ₉ + NiO + Al ₂ NiO ₄	Al ₂ O ₃ + Na ₅ AlP ₂ (O ₄ F) ₂ + V ₂ O ₃ + Na ₃ AlF ₆ + Na ₃ V ₂ (PO ₄) ₃	Al ₂ O ₃ + Na ₃ V ₂ (PO ₄) ₃ + NaVO ₃ + Na ₅ AlP ₂ (O ₄ F) ₂ + Na ₃ AlF ₆ + Na ₉ V ₁₄ O ₃₅
NaAlO ₂	NaCrO ₂ + NaAlO ₂	NaMnO ₂ + NaAlO ₂	NaFeO ₂ + NaAlO ₂	NaCoO ₂ + NaAlO ₂	NaNiO ₂ + NaAlO ₂	Na ₅ AlP ₂ (O ₄ F) ₂ + Al ₂ O ₃ + V ₂ O ₃ + NaF	Al ₂ O ₃ + Na ₅ AlP ₂ (O ₄ F) ₂ + NaVO ₃ + Na ₃ VO ₄ + Na ₃ PO ₄ + V ₂ O ₃
Na ₇ Al ₃ O ₈	Na ₇ Al ₃ O ₈ + NaCrO ₂	NaMnO ₂ + Na ₇ Al ₃ O ₈	Na ₇ Al ₃ O ₈ + NaFeO ₂	Na ₃ CoO ₃ + NaAlO ₂ + NaCoO ₂	Na ₇ Al ₃ O ₈ + NaNiO ₂	NaAlO ₂ + Na ₃ PO ₄ + NaVO ₂ + NaF + Al ₂ O ₃	NaAlO ₂ + Na ₃ PO ₄ + Na ₃ VO ₄ + NaVO ₂ + NaF + Al ₂ O ₃
Na ₁₇ Al ₅ O ₁₆	NaCrO ₂ + Na ₁₄ Al ₄ O ₁₃ + Na ₇ Al ₃ O ₈	NaMnO ₂ + Na ₁₄ Al ₄ O ₁₃ + Na ₇ Al ₃ O ₈	Na ₇ Al ₃ O ₈ + Na ₃ FeO ₃ + Na ₅ FeO ₄	Na ₃ CoO ₃ + NaAlO ₂ + NaCoO ₂	Na ₁₄ Al ₄ O ₁₃ + Na ₇ Al ₃ O ₈ + NaNiO ₂	Na ₃ PO ₄ + NaAlO ₂ + NaVO ₂ + NaF + Al ₂ O ₃	Na ₃ PO ₄ + NaAlO ₂ + Na ₃ VO ₄ + NaVO ₂ + NaF + Al ₂ O ₃
Na ₁₄ Al ₄ O ₁₃	NaCrO ₂ + Na ₁₄ Al ₄ O ₁₃	NaMnO ₂ + Na ₁₄ Al ₄ O ₁₃	Na ₇ Al ₃ O ₈ + Na ₅ FeO ₄ + Na ₃ FeO ₃	Na ₃ CoO ₃ + NaAlO ₂ + Na ₇ Al ₃ O ₈	NaNiO ₂ + Na ₁₄ Al ₄ O ₁₃	Na ₃ PO ₄ + NaAlO ₂ + NaVO ₂ + NaF + V ₃ P + Na ₃ VO ₄	Na ₃ PO ₄ + NaAlO ₂ + Na ₃ VO ₄ + NaVO ₂ + NaF + V ₃ P
Na ₅ AlO ₄	NaCrO ₂ + Na ₅ AlO ₄	Na ₄ Mn ₂ O ₅ + Na ₁₄ Al ₄ O ₁₃ + NaMnO ₂	Na ₅ FeO ₄ + Na ₇ Al ₃ O ₈ + Na ₁₄ Al ₄ O ₁₃	Na ₃ CoO ₃ + NaAlO ₂ + Na ₇ Al ₃ O ₈	Na ₁₄ Al ₄ O ₁₃ + Na ₅ NiO ₄ + Na ₅ AlO ₄	Na ₃ PO ₄ + NaAlO ₂ + NaVO ₂ + NaF + Na ₃ VO ₄ + V ₃ P	Na ₃ PO ₄ + Na ₃ VO ₄ + NaAlO ₂ + NaVO ₂ + NaF + V ₃ P
Na ₃ OBr	NaCrO ₂ + Na ₃ BrO	Na ₃ BrO + NaMnO ₂	Na ₅ FeO ₄ + NaBr + Na ₃ FeO ₃	Na ₃ CoO ₃ + NaBr + NaCoO ₂	Na ₅ NiO ₄ + NaBr + NaNiO ₂	Na ₃ PO ₄ + NaBr + NaVO ₂ + NaF + Na ₃ VO ₄ + V ₃ P	Na ₃ PO ₄ + Na ₃ VO ₄ + NaBr + NaVO ₂ + NaF + V ₃ P

TABLE S4: Predicted interface reaction products between electrolytes and fully discharged cathodes

	NaCrO ₂	NaMnO ₂	NaFeO ₂	NaCoO ₂	NaNiO ₂	Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ V ₂ P ₂ O ₁₀ F
Na ₄ OI ₂	NaCrO ₂ + Na ₄ I ₂ O	NaMnO ₂ + Na ₄ I ₂ O	Na ₅ FeO ₄ + NaI + Na ₃ FeO ₃	Na ₃ CoO ₃ + NaI + NaCoO ₂	Na ₅ NiO ₄ + NaI + NaNiO ₂	NaI + Na ₃ PO ₄ + NaVO ₂ + NaF + Na ₃ VO ₄ + V ₃ P	Na ₃ PO ₄ + NaI + Na ₃ VO ₄ + NaVO ₂ + NaF + V ₃ P
NaAlCl ₄	NaCl + Cr ₂ O ₃ + Al ₂ O ₃ + CrClO	Na ₆ MnCl ₈ + Al ₂ O ₃ + Mn ₈ Cl ₃ O ₁₀ + MnO ₂ + NaCl	NaCl + Fe ₂ O ₃ + Al ₂ O ₃ + NaFeCl ₄	Na ₂ CoCl ₄ + Al ₂ O ₃ + ClO ₂ + NaCl + Co ₃ O ₄	NaCl + NiCl ₂ + Al ₂ O ₃ + ClO ₂ + Al ₂ NiO ₄	NaCl + AlPO ₄ + VCl ₃ + AlF ₃	AlPO ₄ + NaCl + VCl ₂ O + AlF ₃ + VCl ₃ O + Al ₂ O ₃ + VCl ₃
Na ₅ Al ₃ F ₁₄	Na ₃ AlF ₆ + Cr ₂ O ₃ + Al ₂ O ₃ + NaF	NaF + Mn ₃ O ₄ + NaMn ₃ O ₆ + Al ₂ O ₃ + Na ₃ AlF ₆	NaF + Fe ₂ O ₃ + Al ₂ O ₃ + Na ₃ AlF ₆	NaF + Na(CoO ₂) ₂ + Co ₃ O ₄ + Al ₂ O ₃ + Na ₃ AlF ₆	NaF + NiO + Al ₂ NiO ₄ + O ₂ + Na ₃ AlF ₆	Na ₃ V ₂ P ₂ O ₈ F ₃ + Na ₅ Al ₃ F ₁₄	NaVPO ₅ + Na ₃ AlF ₆ + Na ₅ Al ₃ F ₁₄
Na ₃ AlF ₆	NaF + Cr ₂ O ₃ + Al ₂ O ₃ + NaCrO ₂	NaF + Mn ₃ O ₄ + Al ₂ O ₃ + NaMn ₃ O ₆ + Na ₂ Mn ₃ O ₇	NaF + Fe ₂ O ₃ + Al ₂ O ₃ + NaAlO ₂	NaF + Na(CoO ₂) ₂ + Co ₃ O ₄ + Al ₂ O ₃	NaF + Na(NiO ₂) ₃ + Al ₂ NiO ₄ + NiO	Na ₃ AlF ₆ + Na ₃ V ₂ P ₂ O ₈ F ₃	Na ₃ AlF ₆ + Na ₃ V ₂ P ₂ O ₁₀ F
Na ₂ B ₁₂ H ₁₂	NaBH ₄ + NaBO ₂ + Cr ₂ B + Na ₃ B ₇ O ₁₂ + Cr ₅ B ₃	NaBO ₂ + NaBH ₄ + Mn + MnO + Mn ₃ (BO ₃) ₂	NaBO ₂ + NaH ₃ O ₂ + Fe + Na ₄ B ₂ O ₅ + NaBH ₄	NaBO ₂ + NaH ₃ O ₂ + Co + Na ₄ B ₂ O ₅ + CoO	NaBO ₂ + NaH ₃ O ₂ + Ni + Na ₄ B ₂ O ₅ + NiO	Na ₂ B ₈ O ₁₃ + NaF + H ₂ + VP + NaHF ₂ + H ₃ OF	Na ₃ B ₇ O ₁₂ + Na ₂ H ₁₆ O ₉ + VP + NaBH ₄ + NaF + NaBO ₂
NaBH ₄	NaCrO ₂ + NaBH ₄	NaHO + MnO + Na ₃ BO ₃ + Mn	NaH ₃ O ₂ + Na ₄ B ₂ O ₅ + Fe + NaHO	NaH ₃ O ₂ + Na ₄ B ₂ O ₅ + Co + NaHO	NaH ₃ O ₂ + Na ₄ B ₂ O ₅ + Ni + NaHO	Na ₂ H ₁₆ O ₉ + NaF + Na ₃ B ₇ O ₁₂ + VP + NaBO ₂	Na ₂ PH ₅ O ₆ + Na ₃ B ₇ O ₁₂ + NaF + VP + VBO ₃ + Na ₂ H ₁₆ O ₉

TABLE S5: Predicted interface reaction products between electrolytes and half charged cathodes

	Na _{0.5} CrO ₂	Na _{0.5} MnO ₂	Na _{0.5} FeO ₂	Na _{0.5} CoO ₂	Na _{0.5} NiO ₂	Na _{1.5} V ₂ P ₂ O ₈ F ₃	Na _{1.5} V ₂ P ₂ O ₁₀ F
Na ₃ PSe ₄	NaCrSe ₂ + Na ₄ P ₂ O ₇ + Na ₃ PO ₄ + Se + Cr ₂ O ₃	Na ₃ PO ₄ + MnSe ₂ + Na ₂ Mn ₂ Se ₃ + Na ₆ MnSe ₄ + MnO	Na ₃ PO ₄ + FeSe ₂ + Na ₂ Se + FeSe + FeO	Na ₃ PO ₄ + Co ₃ Se ₄ + NaSe + NaSe ₂ + Na ₂ SeO ₃	Na ₃ PO ₄ + Ni ₃ Se ₄ + NaSe + NaSe ₂ + Na ₂ SeO ₃	NaVP ₂ O ₇ + NaF + VSe ₂ + NaPF ₆ + V ₂ Se ₉ + PSe	Na ₃ V ₂ (PO ₄) ₃ + NaVP ₂ O ₇ + V ₂ Se ₉ + NaF + Se + VF ₃
Na ₄ SiS ₄	NaCrS ₂ + Na ₂ SiO ₃ + Na ₂ S + SO ₂ + NaCrO ₂	MnO + Na ₂ S + Na ₂ SiO ₃ + SO ₂	Na ₂ SiO ₃ + Na ₅ FeS ₄ + FeS ₂ + Na ₃ (FeS ₂) ₂ + Na ₂ SO ₄	Na ₂ SiO ₃ + Co ₉ S ₈ + Na ₂ SO ₄ + Na ₂ S + Na ₄ SiO ₄	Na ₂ SO ₄ + Na ₄ SiO ₄ + Ni ₃ S ₂ + Na ₂ SiO ₃ + Ni	Na ₃ PS ₃ O + Na ₄ P ₂ O ₇ + NaF + VS ₂ + SiO ₂ + Na ₃ V ₂ (PO ₄) ₃ + V ₃ S ₄	Na ₃ V ₂ (PO ₄) ₃ + Na ₃ VS ₄ + Na ₄ P ₂ O ₇ + SiO ₂ + VS ₄ + NaF + SO ₂
Na ₃ PS ₄	Na ₃ PO ₄ + NaCrS ₂ + Cr ₂ O ₃ + SO ₂ + Na ₄ P ₂ O ₇	MnO + Na ₂ S + NaMnPO ₄ + SO ₂ + Na ₃ PO ₄	Na ₃ PO ₄ + FeS ₂ + Na ₃ (FeS ₂) ₂ + Na ₂ SO ₄ + Fe ₃ O ₄	Na ₃ PO ₄ + Co ₉ S ₈ + Na ₂ SO ₄ + Na ₂ S + CoS ₂	Na ₃ PO ₄ + Na ₂ SO ₄ + Ni ₃ S ₂ + SO ₂ + NiO	NaVP ₂ O ₇ + NaF + VS ₂ + NaPF ₆ + VS ₄ + Na ₃ PS ₄	Na ₃ V ₂ (PO ₄) ₃ + NaVP ₂ O ₇ + VS ₄ + NaF + SO ₂ + VS ₂
Na ₁₀ SnP ₂ S ₁₂	NaCrO ₂ + Cr ₂ O ₃ + SO ₂ + Na ₃ PO ₄ + Na ₄ SnS ₄ + NaCrS ₂	MnO + Na ₂ SO ₄ + Na ₃ PO ₄ + Na ₄ SnS ₄ + Na ₂ S + SO ₂	Na ₃ PO ₄ + Na ₄ SnS ₄ + FeS ₂ + Na ₃ (FeS ₂) ₂ + Na ₂ SnO ₃ + Na ₂ SO ₄	Co ₉ S ₈ + Na ₃ PO ₄ + Na ₂ SO ₄ + Na ₂ SnO ₃ + Na ₂ S + Na ₄ SnS ₄	Na ₂ SO ₄ + Ni ₃ S ₂ + Na ₃ PO ₄ + Na ₂ SnO ₃ + Ni + NiO	NaVP ₂ O ₇ + NaF + VS ₂ + NaPF ₆ + VS ₄ + SnS ₂ + Na ₂ SnF ₆	Na ₃ V ₂ (PO ₄) ₃ + NaF + VS ₄ + SO ₂ + SnS ₂ + Na ₂ SnF ₆ + VS ₂
Na ₃ SbS ₄	NaCrO ₂ + Cr ₂ O ₃ + SO ₂ + NaSbS ₂ + NaSbO ₃	MnO + Na ₂ SO ₄ + NaMnO ₂ + Na ₃ SbO ₄ + Na ₂ S	NaFeO ₂ + Fe ₃ O ₄ + Na ₂ SO ₄ + NaSbO ₃ + NaSbS ₂	Na ₃ SbO ₄ + Co ₉ S ₈ + Na ₂ SO ₄ + Na ₂ S + Co	Na ₂ SO ₄ + NiO + Ni + Ni ₅ Sb ₂ + Na ₃ SbO ₄	Na ₃ V ₂ (PO ₄) ₃ + NaSbS ₂ + NaF + VS ₄ + NaVP ₂ O ₇ + SO ₂ + Na ₅ P ₃ O ₁₀	Na ₃ V ₂ (PO ₄) ₃ + SO ₂ + NaF + Sb ₂ S ₃ + V ₂ O ₃ + VS ₂ + NaSbS ₂

TABLE S5: Predicted interface reaction products between electrolytes and half charged cathodes

	$\text{Na}_{0.5}\text{CrO}_2$	$\text{Na}_{0.5}\text{MnO}_2$	$\text{Na}_{0.5}\text{FeO}_2$	$\text{Na}_{0.5}\text{CoO}_2$	$\text{Na}_{0.5}\text{NiO}_2$	$\text{Na}_{1.5}\text{V}_2\text{P}_2\text{O}_8\text{F}_3$	$\text{Na}_{1.5}\text{V}_2\text{P}_2\text{O}_{10}\text{F}$
NaPO_3	$\text{Na}_4\text{P}_2\text{O}_7 + \text{CrO}_2 + \text{Cr}_2\text{O}_3 + \text{NaCrP}_2\text{O}_7$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{MnO}_2 + \text{NaMnPO}_4 + \text{NaMn}_3\text{O}_6$	$\text{Na}_3\text{Fe}(\text{PO}_4)_2 + \text{Fe}_2\text{O}_3 + \text{O}_2 + \text{Na}_3\text{Fe}_2(\text{PO}_4)_3$	$\text{Na}(\text{CoO}_2)_3 + \text{Na}_5\text{P}_3\text{O}_{10} + \text{NaCoPO}_4 + \text{Na}_4\text{P}_2\text{O}_7$	$\text{NaNiPO}_4 + \text{Na}_4\text{P}_2\text{O}_7 + \text{O}_2 + \text{Na}_3\text{PO}_4$	$\text{NaVPO}_5 + \text{NaVP}_2\text{O}_7 + \text{NaPF}_6 + \text{NaPO}_3$	$\text{VPO}_5 + \text{Na}_2\text{VPO}_6 + \text{NaVPO}_5 + \text{NaPF}_6 + \text{NaPO}_3$
NaNbO_3	$\text{NaNbO}_3 + \text{Cr}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{NaCrO}_2$	$\text{NaNbO}_3 + \text{NaMn}_2\text{O}_4$	$\text{Fe}_2\text{O}_3 + \text{Na}_3\text{NbO}_4 + \text{O}_2 + \text{NaNbO}_3$	$\text{NaNbO}_3 + \text{Na}(\text{CoO}_2)_2$	$\text{Na}_5(\text{NiO}_2)_9 + \text{Na}(\text{NiO}_2)_3 + \text{NaNbO}_3$	$\text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaNb}(\text{OF})_2 + \text{NaVPO}_5 + \text{Nb}_2\text{O}_5 + \text{NaVO}_3 + \text{Na}_9\text{V}_{14}\text{O}_{35}$	$\text{NbPO}_5 + \text{NaVO}_3 + \text{NaVPO}_5 + \text{NaF} + \text{NaNb}_2\text{PO}_8$
Na_2SO_4	$\text{Cr}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{NaCrO}_2 + \text{Na}_2\text{SO}_4$	$\text{NaMn}_2\text{O}_4 + \text{Na}_2\text{SO}_4$	$\text{NaFeO}_2 + \text{Fe}_2\text{O}_3 + \text{O}_2 + \text{Na}_2\text{SO}_4$	$\text{Na}_2\text{SO}_4 + \text{Na}(\text{CoO}_2)_2$	$\text{Na}_5(\text{NiO}_2)_9 + \text{Na}(\text{NiO}_2)_3 + \text{Na}_2\text{SO}_4$	$\text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{SO}_3 + \text{NaF} + \text{NaVO}_3 + \text{Na}_4\text{P}_2\text{O}_7 + \text{Na}_2\text{VPO}_6$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{SO}_3 + \text{NaVO}_3 + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaF} + \text{SO}_2$
Na_2CO_3	$\text{NaCrO}_2 + \text{Na}_2\text{CrO}_4 + \text{CO}_2 + \text{Cr}_2\text{O}_3$	$\text{Na}_2\text{CO}_3 + \text{NaMn}_2\text{O}_4$	$\text{Na}_2\text{CO}_3 + \text{NaFeO}_2 + \text{Fe}_2\text{O}_3 + \text{O}_2$	$\text{Na}(\text{CoO}_2)_2 + \text{Na}_2\text{CO}_3$	$\text{Na}_2\text{CO}_3 + \text{Na}_5(\text{NiO}_2)_9 + \text{Na}(\text{NiO}_2)_3$	$\text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{CO}_2 + \text{NaF} + \text{NaVO}_3 + \text{Na}_4\text{P}_2\text{O}_7 + \text{Na}_2\text{VPO}_6$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{NaVO}_3 + \text{CO}_2 + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaF} + \text{Na}_3\text{PO}_4$
Na_3SbO_4	$\text{NaCrO}_2 + \text{NaSbO}_3 + \text{Na}_2\text{CrO}_4 + \text{Cr}_2\text{O}_3$	$\text{Na}_2\text{Mn}_3\text{O}_7 + \text{NaMnO}_2 + \text{NaSbO}_3 + \text{Na}_3\text{Mn}_4\text{O}_8$	$\text{NaFeO}_2 + \text{NaSbO}_3 + \text{O}_2 + \text{Fe}_2\text{O}_3$	$\text{Na}(\text{CoO}_2)_2 + \text{Na}_3\text{SbO}_4$	$\text{Na}_5(\text{NiO}_2)_9 + \text{NaSbO}_3 + \text{O}_2 + \text{Na}_3\text{SbO}_4$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{NaVO}_3 + \text{NaSbO}_3 + \text{NaF} + \text{Sb}_2\text{O}_3 + \text{NaSb}_3(\text{PO}_5)_2$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{NaSbO}_3 + \text{NaVO}_3 + \text{NaF} + \text{Sb}_2\text{O}_3$
Na_3NbO_4	$\text{NaCrO}_2 + \text{NaNbO}_3 + \text{Na}_2\text{CrO}_4 + \text{Cr}_2\text{O}_3$	$\text{Na}_3\text{Mn}_4\text{O}_8 + \text{Na}_2\text{Mn}_3\text{O}_7 + \text{NaNbO}_3 + \text{Na}_2\text{Mn}_3\text{O}_6$	$\text{Na}_3\text{NbO}_4 + \text{NaFeO}_2 + \text{Fe}_2\text{O}_3 + \text{O}_2$	$\text{Na}_3\text{NbO}_4 + \text{Na}(\text{CoO}_2)_2$	$\text{Na}_5(\text{NiO}_2)_9 + \text{NaNbO}_3 + \text{O}_2 + \text{Na}_3\text{NbO}_4$	$\text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaF} + \text{Nb}_2\text{O}_5 + \text{NaVO}_3 + \text{Na}_4\text{P}_2\text{O}_7 + \text{NaNbO}_3$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{NaVO}_3 + \text{Nb}_2\text{O}_5 + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaF} + \text{NaNb}_2\text{PO}_8$
Na_3PO_4	$\text{Na}_3\text{PO}_4 + \text{Cr}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{NaCrO}_2$	$\text{Na}_3\text{PO}_4 + \text{NaMn}_2\text{O}_4$	$\text{Na}_3\text{PO}_4 + \text{NaFeO}_2 + \text{Fe}_2\text{O}_3 + \text{O}_2$	$\text{Na}_3\text{PO}_4 + \text{Na}(\text{CoO}_2)_2$	$\text{Na}_3\text{PO}_4 + \text{Na}_5(\text{NiO}_2)_9 + \text{Na}(\text{NiO}_2)_3$	$\text{NaVPO}_5 + \text{NaF} + \text{NaVP}_2\text{O}_7 + \text{NaPO}_3 + \text{Na}_5\text{P}_3\text{O}_{10}$	$\text{Na}_2\text{VPO}_6 + \text{NaPO}_3 + \text{NaVPO}_5 + \text{NaF} + \text{Na}_5\text{P}_3\text{O}_{10}$
Na_3BO_3	$\text{NaCrO}_2 + \text{NaBO}_2 + \text{Na}_2\text{CrO}_4$	$\text{Na}_2\text{MnO}_3 + \text{NaBO}_2 + \text{NaMnO}_2$	$\text{NaFeO}_2 + \text{NaBO}_2 + \text{Na}_2\text{FeO}_4$	$\text{Na}_2(\text{CoO}_2)_3 + \text{Na}_4\text{B}_2\text{O}_5 + \text{NaO}_2 + \text{Na}_3\text{BO}_3$	$\text{NaNiO}_2 + \text{Na}_4\text{B}_2\text{O}_5 + \text{O}_2$	$\text{Na}_3\text{PO}_4 + \text{Na}_3\text{B}_7\text{O}_{12} + \text{NaF} + \text{VBO}_3 + \text{Na}_3\text{VO}_4 + \text{Na}_2\text{V}_3\text{O}_7$	$\text{Na}_3\text{PO}_4 + \text{Na}_3\text{B}_7\text{O}_{12} + \text{Na}_3\text{VO}_4 + \text{NaF} + \text{Na}_2\text{V}_3\text{O}_7 + \text{NaVO}_3$
Na_4SiO_4	$\text{NaCrO}_2 + \text{Na}_2\text{SiO}_3 + \text{Na}_2\text{CrO}_4 + \text{Cr}_2\text{O}_3$	$\text{NaMnO}_2 + \text{Na}_2\text{Mn}_3\text{O}_7 + \text{Na}_2\text{SiO}_3$	$\text{NaFeO}_2 + \text{Na}_2\text{SiO}_3 + \text{O}_2 + \text{Na}_2\text{FeO}_4$	$\text{Na}(\text{CoO}_2)_2 + \text{Na}_4\text{SiO}_4$	$\text{NaNiO}_2 + \text{Na}_2\text{SiO}_3 + \text{O}_2 + \text{Na}_5(\text{NiO}_2)_9$	$\text{NaV}(\text{SiO}_3)_2 + \text{Na}_4\text{P}_2\text{O}_7 + \text{NaF} + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaVO}_3 + \text{Na}_3\text{PO}_4$	$\text{Na}_4\text{P}_2\text{O}_7 + \text{NaVO}_3 + \text{SiO}_2 + \text{NaV}(\text{SiO}_3)_2 + \text{NaF} + \text{Na}_3\text{PO}_4$
$\text{NaTi}_2(\text{PO}_4)_3$	$\text{Na}_4\text{TiP}_2\text{O}_9 + \text{CrO}_2 + \text{Cr}_2\text{O}_3 + \text{NaTiPO}_5 + \text{Na}_2\text{CrO}_4$	$\text{MnO}_2 + \text{NaMnPO}_4 + \text{Na}_4\text{TiP}_2\text{O}_9 + \text{TiO}_2 + \text{NaMn}_3\text{O}_6$	$\text{Fe}_2\text{O}_3 + \text{Na}_4\text{TiP}_2\text{O}_9 + \text{O}_2 + \text{TiO}_2 + \text{Na}_3\text{Fe}_2(\text{PO}_4)_3$	$\text{Na}(\text{CoO}_2)_3 + \text{Na}_4\text{TiP}_2\text{O}_9 + \text{NaTiPO}_5 + \text{Co}_3\text{O}_4 + \text{NaCoPO}_4$	$\text{NaNiPO}_4 + \text{TiNiO}_3 + \text{O}_2 + \text{Na}_4\text{TiP}_2\text{O}_9 + \text{TiO}_2$	$\text{NaVP}_2\text{O}_7 + \text{V}_6\text{O}_{13} + \text{NaPF}_6 + \text{Na}_2\text{TiF}_6 + \text{NaVPO}_5 + \text{VF}_3$	$\text{NaTi}_2(\text{PO}_4)_3 + \text{VPO}_5 + \text{Na}_2\text{VPO}_6 + \text{NaVPO}_5 + \text{NaPF}_6 + \text{NaVO}_3$
$\text{NaZr}_2(\text{PO}_4)_3$	$\text{Cr}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{Na}_4\text{P}_2\text{O}_7 + \text{ZrO}_2 + \text{NaZr}_2(\text{PO}_4)_3$	$\text{NaMn}_3\text{O}_6 + \text{NaMnPO}_4 + \text{Na}_4\text{P}_2\text{O}_7 + \text{ZrO}_2 + \text{Na}_3\text{PO}_4$	$\text{Fe}_2\text{O}_3 + \text{Na}_3\text{PO}_4 + \text{ZrO}_2 + \text{O}_2 + \text{Na}_3\text{Fe}(\text{PO}_4)_2$	$\text{Na}(\text{CoO}_2)_2 + \text{NaZr}_2(\text{PO}_4)_3$	$\text{NaNiPO}_4 + \text{ZrO}_2 + \text{O}_2 + \text{NiO} + \text{Na}_3\text{PO}_4$	$\text{NaVP}_2\text{O}_7 + \text{VPO}_5 + \text{Na}_2\text{ZrF}_6 + \text{VPO}_4 + \text{NaZr}_2(\text{PO}_4)_3$	$\text{VPO}_5 + \text{NaVPO}_5 + \text{Na}_2\text{VPO}_6 + \text{NaPF}_6 + \text{Na}_2\text{ZrF}_6 + \text{NaZr}_2(\text{PO}_4)_3$

TABLE S5: Predicted interface reaction products between electrolytes and half charged cathodes

	$\text{Na}_{0.5}\text{CrO}_2$	$\text{Na}_{0.5}\text{MnO}_2$	$\text{Na}_{0.5}\text{FeO}_2$	$\text{Na}_{0.5}\text{CoO}_2$	$\text{Na}_{0.5}\text{NiO}_2$	$\text{Na}_{1.5}\text{V}_2\text{P}_2\text{O}_8\text{F}_3$	$\text{Na}_{1.5}\text{V}_2\text{P}_2\text{O}_{10}\text{F}$
$\text{Na}_3\text{Zr}_2\text{Si}_2\text{PO}_{12}$	$\text{Cr}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{Na}_2\text{SiO}_3 + \text{Na}_3\text{PO}_4 + \text{ZrO}_2 + \text{ZrSiO}_4$	$\text{NaMn}_3\text{O}_6 + \text{Na}_2\text{SiO}_3 + \text{Na}_3\text{PO}_4 + \text{Mn}_7\text{SiO}_{12} + \text{ZrO}_2 + \text{Mn}_3\text{O}_4$	$\text{Fe}_2\text{O}_3 + \text{Na}_2\text{SiO}_3 + \text{Na}_3\text{PO}_4 + \text{ZrO}_2 + \text{O}_2 + \text{ZrSiO}_4$	$\text{ZrSiO}_4 + \text{Na}_3\text{PO}_4 + \text{Na}(\text{CoO}_2)_2$	$\text{Na}(\text{NiO}_2)_3 + \text{Na}_2\text{SiO}_3 + \text{Na}_3\text{PO}_4 + \text{ZrO}_2 + \text{NiO} + \text{ZrSiO}_4$	$\text{NaVPO}_5 + \text{Na}_2\text{ZrF}_6 + \text{NaZr}_2(\text{PO}_4)_3 + \text{SiO}_2 + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{V}_3\text{O}_5 + \text{ZrSiO}_4$	$\text{NaZr}_2(\text{PO}_4)_3 + \text{NaVO}_3 + \text{NaVPO}_5 + \text{Na}_2\text{VPO}_6 + \text{SiO}_2 + \text{Na}_2\text{SiF}_6 + \text{NaF}$
$\text{Na}_4\text{Zr}_2(\text{SiO}_4)_3$	$\text{Cr}_2\text{O}_3 + \text{Na}_2\text{SiO}_3 + \text{Na}_2\text{CrO}_4 + \text{ZrO}_2 + \text{NaCrO}_2$	$\text{NaMn}_3\text{O}_6 + \text{Na}_2\text{SiO}_3 + \text{ZrO}_2 + \text{Mn}_3\text{O}_4$	$\text{Na}_2\text{SiO}_3 + \text{Fe}_2\text{O}_3 + \text{ZrO}_2 + \text{O}_2$	$\text{Na}(\text{CoO}_2)_2 + \text{Na}_2\text{SiO}_3 + \text{ZrSiO}_4 + \text{ZrO}_2$	$\text{Na}(\text{NiO}_2)_3 + \text{Na}_2\text{SiO}_3 + \text{ZrO}_2 + \text{NiO} + \text{ZrSiO}_4$	$\text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{Na}_2\text{ZrF}_6 + \text{NaVO}_3 + \text{SiO}_2 + \text{ZrSiO}_4 + \text{NaZr}_2(\text{PO}_4)_3 + \text{NaF}$	$\text{NaZr}_2(\text{PO}_4)_3 + \text{NaVO}_3 + \text{SiO}_2 + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaF} + \text{Na}_4\text{P}_2\text{O}_7 + \text{ZrSiO}_4$
$\text{NaAl}_{11}\text{O}_{17}$	$\text{Al}_2\text{O}_3 + \text{NaCrO}_2 + \text{Na}_2\text{CrO}_4 + \text{Cr}_2\text{O}_3$	$\text{Na}_2\text{Mn}_3\text{O}_7 + \text{MnAl}_2\text{O}_4 + \text{NaAlO}_2 + \text{Mn}_3\text{O}_4$	$\text{Fe}_2\text{O}_3 + \text{NaAlO}_2 + \text{O}_2 + \text{NaFeO}_2$	$\text{Al}_2\text{O}_3 + \text{NaAlO}_2 + \text{Na}(\text{CoO}_2)_2$	$\text{Al}_2\text{NiO}_4 + \text{NaAlO}_2 + \text{O}_2 + \text{Na}(\text{NiO}_2)_3$	$\text{AlPO}_4 + \text{Na}_5\text{Al}_3\text{F}_{14} + \text{V}_3\text{O}_5 + \text{Na}_9\text{V}_{14}\text{O}_{35} + \text{NaVPO}_5 + \text{Na}_3\text{AlF}_6$	$\text{AlPO}_4 + \text{NaVO}_3 + \text{AlF}_3 + \text{NaVPO}_5 + \text{Na}_9\text{V}_{14}\text{O}_{35} + \text{VO}_2$
NaAlO_2	$\text{NaCrO}_2 + \text{Al}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{Cr}_2\text{O}_3$	$\text{NaMn}_2\text{O}_4 + \text{NaAlO}_2$	$\text{NaFeO}_2 + \text{Fe}_2\text{O}_3 + \text{NaAlO}_2 + \text{O}_2$	$\text{NaAlO}_2 + \text{Na}(\text{CoO}_2)_2$	$\text{NaAlO}_2 + \text{Na}_5(\text{NiO}_2)_9 + \text{Na}(\text{NiO}_2)_3$	$\text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{Al}_2\text{O}_3 + \text{Na}_3\text{AlF}_6 + \text{NaVO}_3 + \text{Na}_5\text{AlP}_2(\text{O}_4\text{F})_2 + \text{NaAlPO}_4\text{F}$	$\text{Na}_5\text{AlP}_2(\text{O}_4\text{F})_2 + \text{NaVO}_3 + \text{Al}_2\text{O}_3 + \text{AlPO}_4 + \text{Na}_3\text{V}_2(\text{PO}_4)_3 + \text{NaAlPO}_4\text{F}$
$\text{Na}_7\text{Al}_3\text{O}_8$	$\text{NaCrO}_2 + \text{NaAlO}_2 + \text{Na}_2\text{CrO}_4 + \text{Al}_2\text{O}_3$	$\text{NaAlO}_2 + \text{Na}_2\text{MnO}_3 + \text{NaMnO}_2 + \text{Na}_2\text{Mn}_3\text{O}_7$	$\text{Na}_2\text{FeO}_3 + \text{NaAlO}_2 + \text{NaFeO}_2 + \text{Na}_2\text{FeO}_4$	$\text{NaAlO}_2 + \text{Na}_4\text{CoO}_4 + \text{NaCoO}_2$	$\text{NaNiO}_2 + \text{NaAlO}_2 + \text{Na}_2\text{O}_2 + \text{NaO}_2$	$\text{Na}_5\text{AlP}_2(\text{O}_4\text{F})_2 + \text{Al}_2\text{O}_3 + \text{Na}_3\text{VO}_4 + \text{NaVO}_2 + \text{NaF} + \text{Na}_3\text{PO}_4$	$\text{Na}_3\text{VO}_4 + \text{Na}_5\text{AlP}_2(\text{O}_4\text{F})_2 + \text{Al}_2\text{O}_3 + \text{Na}_3\text{PO}_4 + \text{NaVO}_2 + \text{V}_2\text{O}_3 + \text{Na}_2\text{V}_3\text{O}_7$
$\text{Na}_{17}\text{Al}_5\text{O}_{16}$	$\text{NaCrO}_2 + \text{Na}_2\text{CrO}_4 + \text{NaAlO}_2 + \text{Na}_4\text{CrO}_4$	$\text{Na}_2\text{MnO}_3 + \text{NaMnO}_2 + \text{NaAlO}_2 + \text{Na}_2\text{Mn}_3\text{O}_7$	$\text{Na}_2\text{FeO}_3 + \text{NaFeO}_2 + \text{NaAlO}_2 + \text{Na}_4\text{FeO}_4$	$\text{Na}_4\text{CoO}_4 + \text{NaAlO}_2 + \text{NaCoO}_2 + \text{Na}_2(\text{CoO}_2)_3$	$\text{NaNiO}_2 + \text{NaAlO}_2 + \text{Na}_2\text{O}_2 + \text{NaO}_2$	$\text{Na}_3\text{PO}_4 + \text{Al}_2\text{O}_3 + \text{NaF} + \text{Na}_3\text{VO}_4 + \text{NaVO}_2 + \text{NaAlO}_2$	$\text{Na}_3\text{PO}_4 + \text{Na}_3\text{VO}_4 + \text{Al}_2\text{O}_3 + \text{NaF} + \text{NaVO}_2 + \text{NaAlO}_2$
$\text{Na}_{14}\text{Al}_4\text{O}_{13}$	$\text{NaCrO}_2 + \text{Na}_2\text{CrO}_4 + \text{NaAlO}_2 + \text{Al}_2\text{O}_3$	$\text{Na}_2\text{MnO}_3 + \text{NaMnO}_2 + \text{NaAlO}_2 + \text{Na}_7\text{Al}_3\text{O}_8$	$\text{Na}_2\text{FeO}_3 + \text{NaFeO}_2 + \text{NaAlO}_2 + \text{Na}_4\text{FeO}_4$	$\text{Na}_4\text{CoO}_4 + \text{NaAlO}_2 + \text{NaCoO}_2 + \text{Na}_3\text{CoO}_3$	$\text{NaNiO}_2 + \text{NaAlO}_2 + \text{Na}_2\text{O}_2 + \text{Na}_7\text{Al}_3\text{O}_8$	$\text{Na}_3\text{PO}_4 + \text{Al}_2\text{O}_3 + \text{NaF} + \text{Na}_3\text{VO}_4 + \text{NaVO}_2 + \text{NaAlO}_2$	$\text{Na}_3\text{PO}_4 + \text{Na}_3\text{VO}_4 + \text{Al}_2\text{O}_3 + \text{NaF} + \text{NaVO}_2 + \text{NaAlO}_2$
Na_5AlO_4	$\text{NaCrO}_2 + \text{Na}_2\text{CrO}_4 + \text{NaAlO}_2 + \text{Na}_4\text{CrO}_4$	$\text{Na}_2\text{MnO}_3 + \text{NaMnO}_2 + \text{NaAlO}_2 + \text{Na}_7\text{Al}_3\text{O}_8$	$\text{Na}_2\text{FeO}_3 + \text{NaFeO}_2 + \text{NaAlO}_2 + \text{Na}_4\text{FeO}_4$	$\text{Na}_4\text{CoO}_4 + \text{NaAlO}_2 + \text{NaCoO}_2 + \text{Na}_3\text{CoO}_3$	$\text{NaNiO}_2 + \text{Na}_2\text{O}_2 + \text{NaAlO}_2 + \text{Na}_7\text{Al}_3\text{O}_8$	$\text{Na}_3\text{PO}_4 + \text{NaAlO}_2 + \text{Na}_3\text{VO}_4 + \text{NaF} + \text{NaVO}_2 + \text{Al}_2\text{O}_3$	$\text{Na}_3\text{PO}_4 + \text{Na}_3\text{VO}_4 + \text{NaAlO}_2 + \text{NaF} + \text{NaVO}_2 + \text{Al}_2\text{O}_3$
Na_3OBr	$\text{NaCrO}_2 + \text{Na}_2\text{CrO}_4 + \text{NaBr} + \text{Na}_4\text{CrO}_4$	$\text{Na}_2\text{MnO}_3 + \text{NaMnO}_2 + \text{NaBr} + \text{Na}_3\text{BrO}$	$\text{NaFeO}_2 + \text{NaBrO}_3 + \text{NaBr} + \text{Na}_2\text{FeO}_3$	$\text{Na}_4\text{CoO}_4 + \text{NaBr} + \text{NaCoO}_2 + \text{Na}_3\text{CoO}_3$	$\text{NaNiO}_2 + \text{NaBrO}_3 + \text{NaBr} + \text{NiO}$	$\text{Na}_3\text{PO}_4 + \text{NaBr} + \text{NaF} + \text{Na}_3\text{VO}_4 + \text{NaVO}_2 + \text{V}_2\text{O}_3$	$\text{Na}_3\text{PO}_4 + \text{Na}_3\text{VO}_4 + \text{NaBr} + \text{NaF} + \text{V}_2\text{O}_3 + \text{NaVO}_2$
Na_4OI_2	$\text{NaCrO}_2 + \text{NaI} + \text{Na}_2\text{CrO}_4$	$\text{Na}_2\text{MnO}_3 + \text{NaI} + \text{NaMnO}_2$	$\text{NaFeO}_2 + \text{NaI} + \text{NaIO}_3 + \text{Fe}_2\text{O}_3$	$\text{Na}_4\text{CoO}_4 + \text{NaI} + \text{NaCoO}_2 + \text{NaIO}_3$	$\text{NaNiO}_2 + \text{NaIO}_3 + \text{NiO} + \text{NaI}$	$\text{NaI} + \text{Na}_3\text{PO}_4 + \text{NaF} + \text{Na}_3\text{VO}_4 + \text{NaVO}_2$	$\text{NaI} + \text{Na}_3\text{PO}_4 + \text{Na}_3\text{VO}_4 + \text{NaF} + \text{NaVO}_2$
NaAlCl_4	$\text{Na}_3\text{CrCl}_6 + \text{Al}_2\text{O}_3 + \text{CrCl}_3 + \text{ClO}_2 + \text{CrClO}$	$\text{Na}_6\text{MnCl}_8 + \text{Al}_2\text{O}_3 + \text{MnCl}_2 + \text{ClO}_2 + \text{Mn}_8\text{Cl}_3\text{O}_{10}$	$\text{Fe}_2\text{O}_3 + \text{NaCl} + \text{Al}_2\text{O}_3 + \text{ClO}_2 + \text{NaFeCl}_4$	$\text{Na}_2\text{CoCl}_4 + \text{Al}_2\text{O}_3 + \text{ClO}_2 + \text{CoCl}_2 + \text{Co}_3\text{O}_4$	$\text{NiCl}_2 + \text{NaCl} + \text{Al}_2\text{O}_3 + \text{ClO}_2 + \text{Al}_2\text{NiO}_4$	$\text{AlPO}_4 + \text{NaCl} + \text{VCl}_3 + \text{AlF}_3 + \text{VCl}_3\text{O} + \text{VPCL}_9 + \text{Al}_2\text{O}_3$	$\text{AlPO}_4 + \text{NaCl} + \text{VCl}_3\text{O} + \text{VCl}_2\text{O} + \text{AlF}_3 + \text{VCl}_3 + \text{Al}_2\text{O}_3$

TABLE S5: Predicted interface reaction products between electrolytes and half charged cathodes

	$\text{Na}_{0.5}\text{CrO}_2$	$\text{Na}_{0.5}\text{MnO}_2$	$\text{Na}_{0.5}\text{FeO}_2$	$\text{Na}_{0.5}\text{CoO}_2$	$\text{Na}_{0.5}\text{NiO}_2$	$\text{Na}_{1.5}\text{V}_2\text{P}_2\text{O}_8\text{F}_3$	$\text{Na}_{1.5}\text{V}_2\text{P}_2\text{O}_{10}\text{F}$
$\text{Na}_5\text{Al}_3\text{F}_{14}$	$\text{Na}_3\text{AlF}_6 + \text{CrO}_2 + \text{Cr}_2\text{O}_3 + \text{Al}_2\text{O}_3 + \text{Na}_2\text{CrO}_4$	$\text{Na}_3\text{AlF}_6 + \text{NaMn}_3\text{O}_6 + \text{Mn}_2\text{O}_3 + \text{Al}_2\text{O}_3$	$\text{Fe}_2\text{O}_3 + \text{NaF} + \text{Al}_2\text{O}_3 + \text{O}_2 + \text{Na}_3\text{AlF}_6$	$\text{Na}(\text{CoO}_2)_3 + \text{Na}_3\text{AlF}_6 + \text{Co}_3\text{O}_4 + \text{Al}_2\text{O}_3 + \text{Na}(\text{CoO}_2)_2$	$\text{Na}_3\text{AlF}_6 + \text{NiO} + \text{O}_2 + \text{Al}_2\text{NiO}_4 + \text{NaF}$	$\text{NaVPO}_5 + \text{NaPF}_6 + \text{VF}_3 + \text{AlF}_3 + \text{NaVP}_2\text{O}_7 + \text{Na}_5\text{Al}_3\text{F}_{14}$	$\text{VPO}_5 + \text{Na}_3\text{AlF}_6 + \text{NaVPO}_5$
Na_3AlF_6	$\text{Cr}_2\text{O}_3 + \text{Na}_2\text{CrO}_4 + \text{NaF} + \text{Al}_2\text{O}_3 + \text{Na}_3\text{AlF}_6$	$\text{NaMn}_3\text{O}_6 + \text{NaF} + \text{Mn}_3\text{O}_4 + \text{Al}_2\text{O}_3 + \text{Na}_3\text{AlF}_6$	$\text{Fe}_2\text{O}_3 + \text{NaF} + \text{Al}_2\text{O}_3 + \text{O}_2 + \text{NaAlO}_2$	$\text{Na}_3\text{AlF}_6 + \text{Na}(\text{CoO}_2)_2$	$\text{NaF} + \text{NiO} + \text{O}_2 + \text{Al}_2\text{NiO}_4 + \text{Na}(\text{NiO}_2)_3$	$\text{NaVPO}_5 + \text{NaPF}_6 + \text{Na}_5\text{Al}_3\text{F}_{14} + \text{VF}_3 + \text{NaVP}_2\text{O}_7 + \text{AlF}_3$	$\text{VPO}_5 + \text{Na}_3\text{AlF}_6 + \text{NaVPO}_5 + \text{Na}_2\text{VPO}_6 + \text{NaPF}_6 + \text{NaVO}_3$
$\text{Na}_2\text{B}_{12}\text{H}_{12}$	$\text{CrHO}_2 + \text{NaBO}_2 + \text{NaCrO}_2 + \text{Cr} + \text{NaBH}_4$	$\text{MnO} + \text{NaBO}_2 + \text{NaH}_3\text{O}_2 + \text{Na}_4\text{B}_2\text{O}_5 + \text{NaBH}_4$	$\text{Na}_3\text{B}_7\text{O}_{12} + \text{Na}_2\text{H}_{16}\text{O}_9 + \text{NaBO}_2 + \text{Fe} + \text{Fe}_3\text{BO}_5$	$\text{Na}_3\text{B}_7\text{O}_{12} + \text{Na}_2\text{H}_{16}\text{O}_9 + \text{NaBO}_2 + \text{Co} + \text{Co}(\text{HO})_2$	$\text{Na}_3\text{B}_7\text{O}_{12} + \text{Na}_2\text{H}_{16}\text{O}_9 + \text{NaBO}_2 + \text{Ni} + \text{Ni}(\text{HO})_2$	$\text{Na}_2\text{B}_8\text{O}_{13} + \text{H}_3\text{OF} + \text{VP} + \text{NaHF}_2 + \text{NaF} + \text{H}_2$	$\text{Na}_2\text{B}_8\text{O}_{13} + \text{B}(\text{HO})_3 + \text{NaH}_9\text{O}_5 + \text{VP} + \text{NaF} + \text{Na}_2\text{PH}_{11}\text{O}_8 + \text{VBO}_3$
NaBH_4	$\text{NaCrO}_2 + \text{CrHO}_2 + \text{Cr}_2\text{O}_3 + \text{NaBO}_2 + \text{Cr}$	$\text{MnO} + \text{NaH}_3\text{O}_2 + \text{Na}_4\text{B}_2\text{O}_5 + \text{NaHO} + \text{NaMnO}_2$	$\text{NaH}_3\text{O}_2 + \text{NaBO}_2 + \text{Fe} + \text{Na}_2\text{H}_{16}\text{O}_9 + \text{NaBH}_4$	$\text{NaH}_3\text{O}_2 + \text{NaBO}_2 + \text{Co} + \text{Na}_2\text{H}_{16}\text{O}_9 + \text{NaBH}_4$	$\text{NaH}_3\text{O}_2 + \text{NaBO}_2 + \text{Ni} + \text{Na}_2\text{H}_{16}\text{O}_9 + \text{NiH}$	$\text{B}(\text{HO})_3 + \text{NaF} + \text{VP} + \text{Na}_2\text{PH}_{11}\text{O}_8 + \text{Na}_4\text{P}_2\text{H}_{20}\text{O}_{17} + \text{VBO}_3 + \text{NaH}_9\text{O}_5$	$\text{Na}_2\text{PH}_5\text{O}_6 + \text{VBO}_3 + \text{NaP}(\text{HO})_6 + \text{NaF} + \text{VP} + \text{Na}_2\text{B}_8\text{O}_{13} + \text{Na}_3\text{V}_2(\text{PO}_4)_3$