

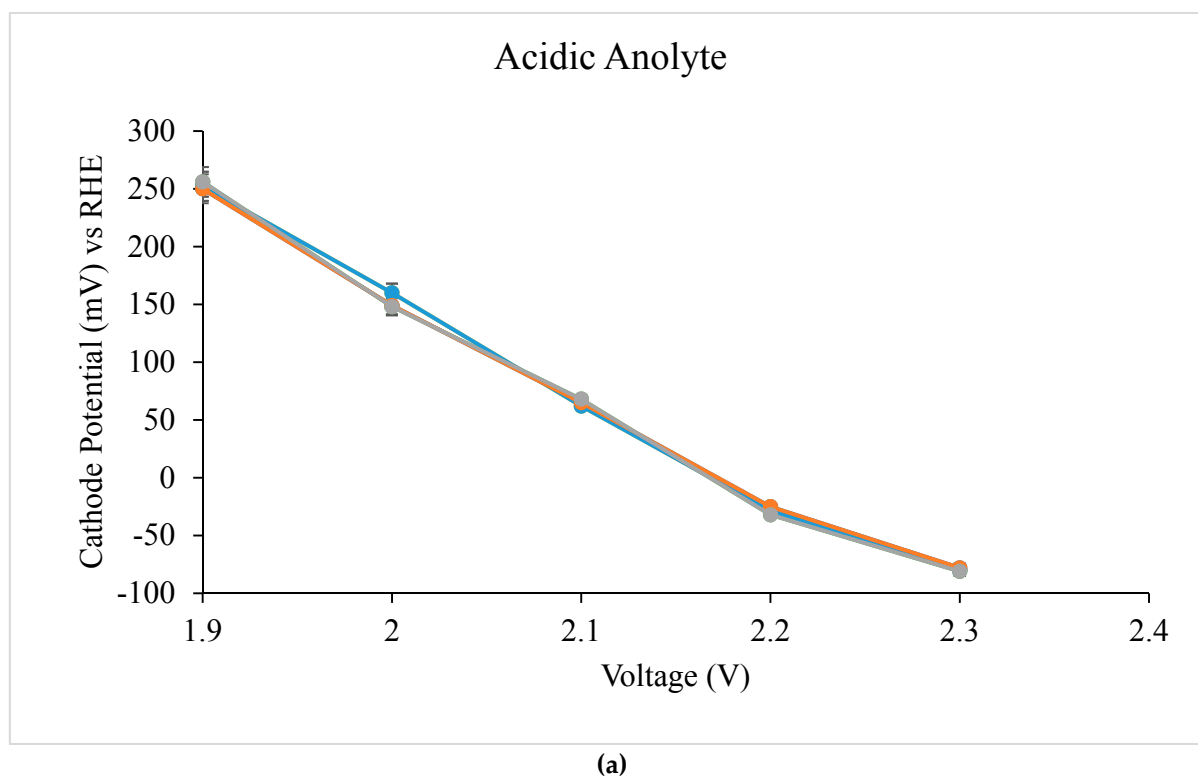
The Effects of Acidic, Alkaline, and Neutral Anolytes on Electrochemical Seawater Deoxygenation

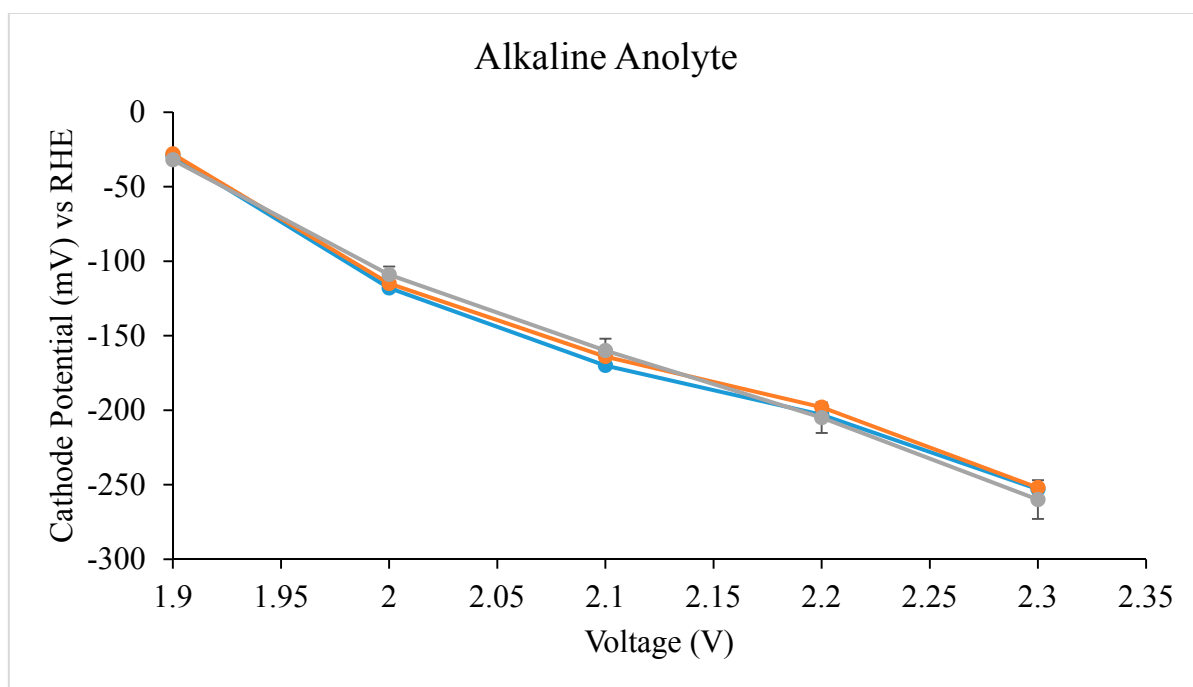
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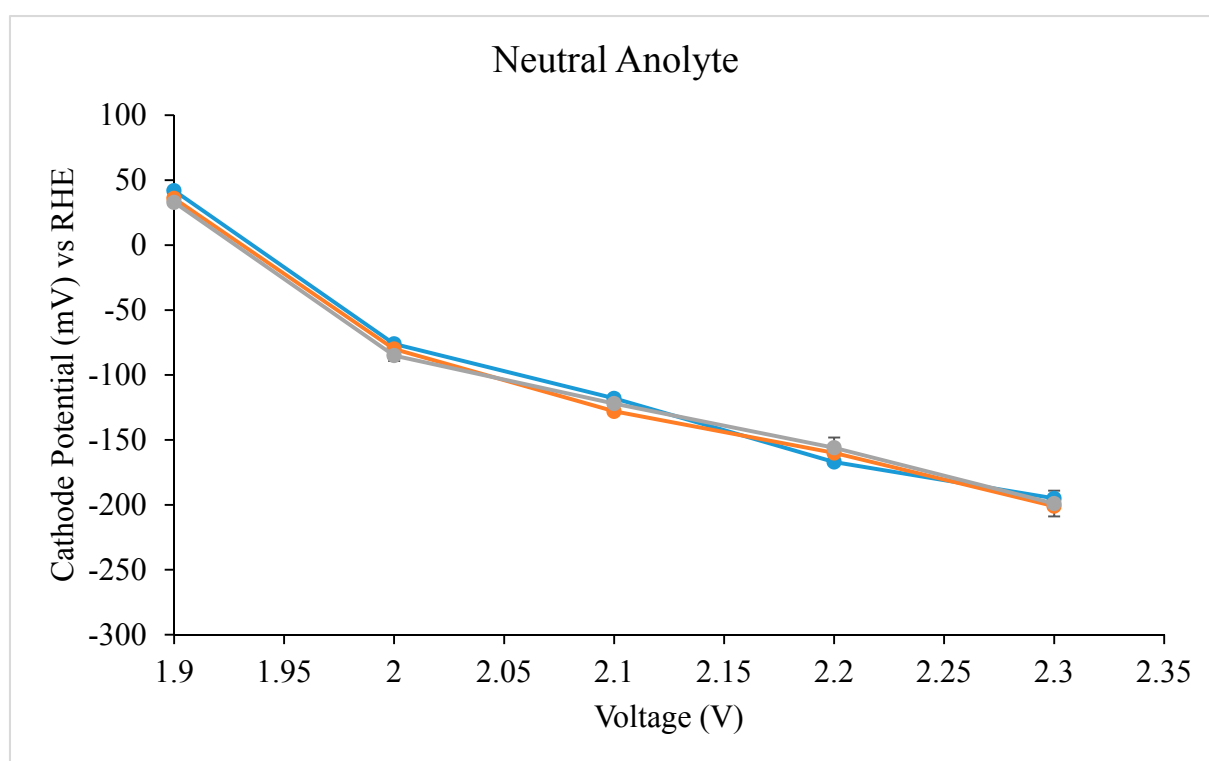
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Supplementary Information



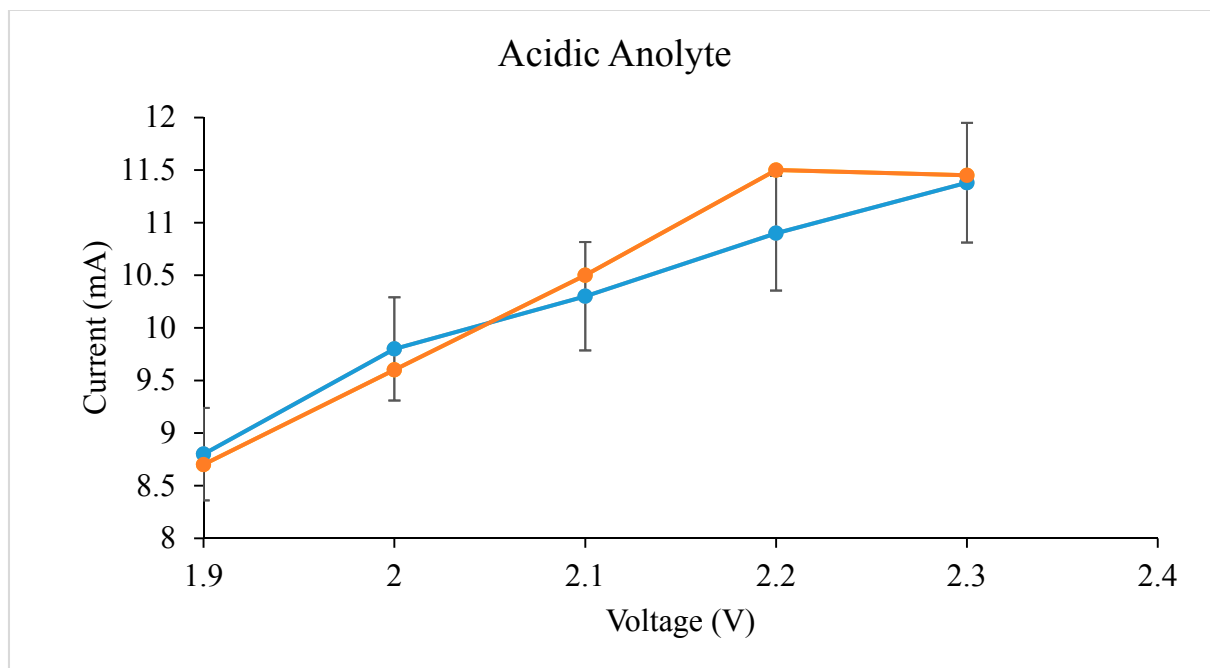


(b)

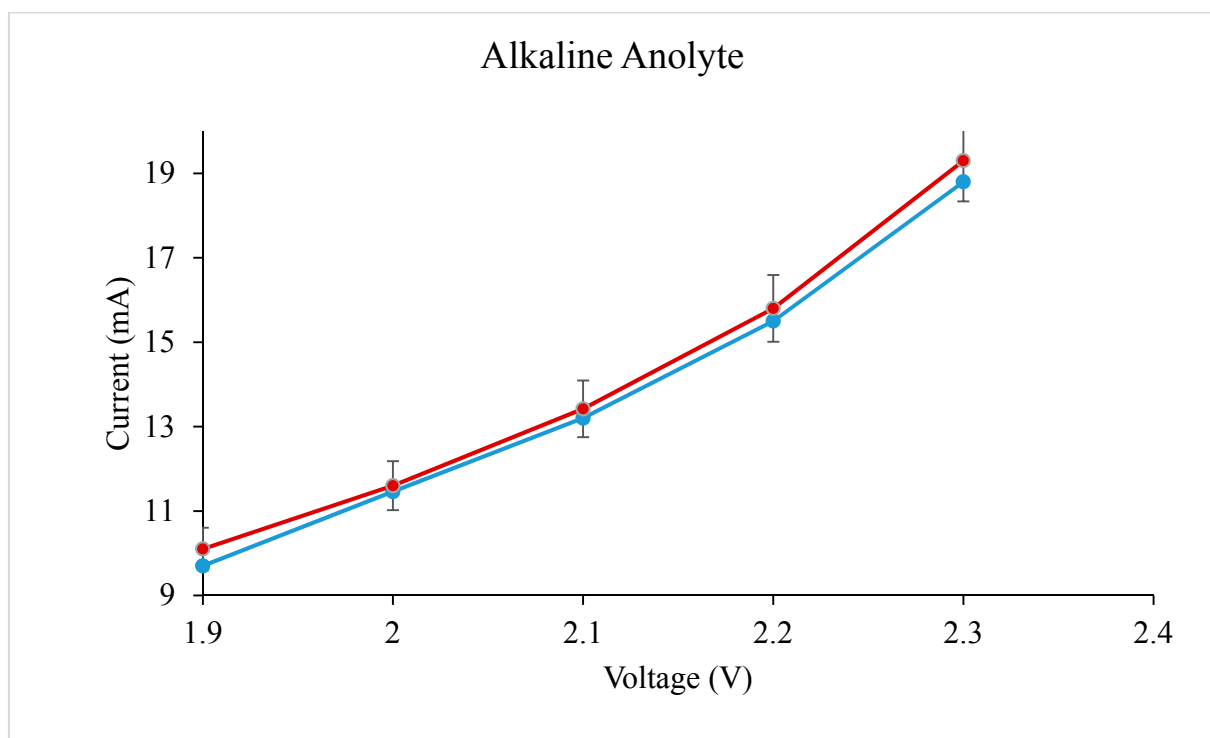


(c)

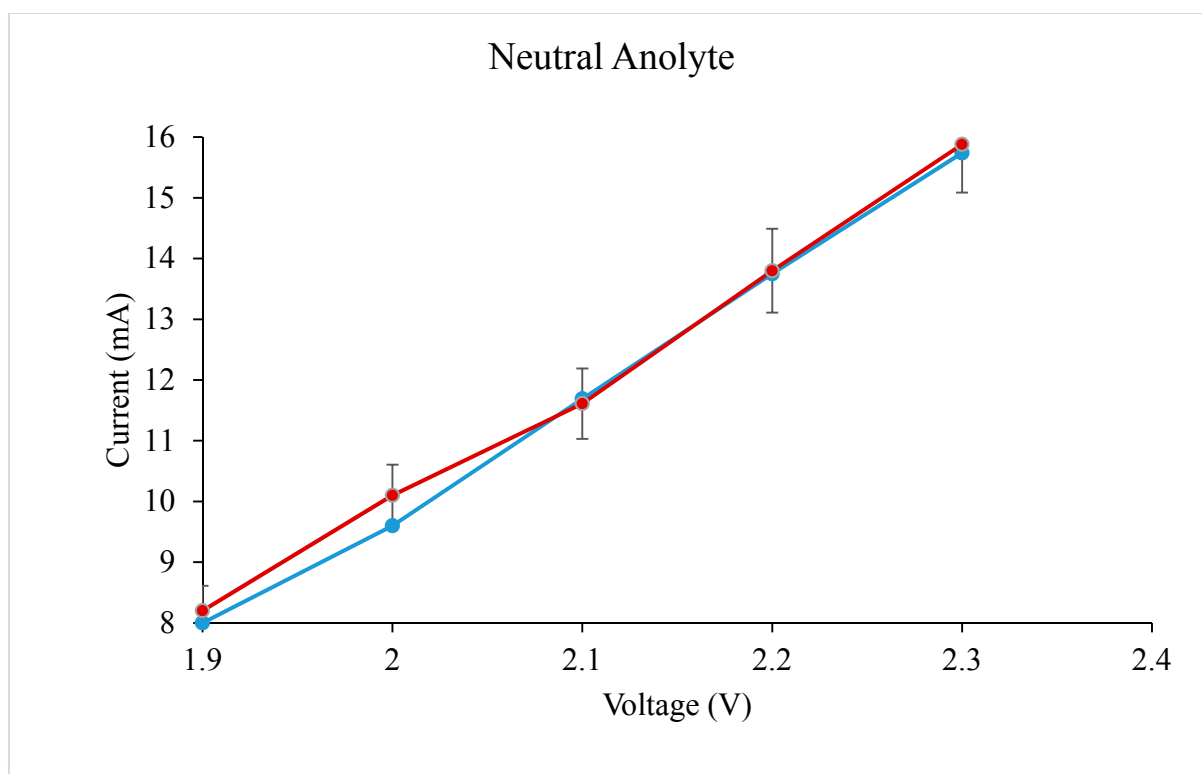
Figure S1. Cathode potentials as function of applied voltage with error bars for (a) acidic, (b) alkaline and (c) neutral solutions.



(a)



(b)



(c)

Figure S2. Currents as function of applied voltage with error bars for (a) acidic, (b) alkaline and (c) neutral solutions.

Table S1. Measured oxygen concentration with standard deviations as function of applied voltage for (a) acidic, (b) alkaline and (c) neutral anolytes.

Acidic Anolyte			
Time	Voltage (V)	Oxygen conc (ppm)	Standard deviation
0	-	8.18	0.00
30	1.9	2.99	0.07
60	2.0	2.25	0.09
90	2.1	2.20	0.12
120	2.2	2.16	0.10
150	2.3	1.60	0.10

(a)

Alkaline Anolyte			
Time	Voltage (V)	Oxygen conc (ppm)	Standard deviation
0	-	8.44	0.00
30	1.90	1.31	0.10
60	2.00	1.20	0.07
90	2.10	1.06	0.06
120	2.20	0.81	0.05
150	2.30	0.55	0.07

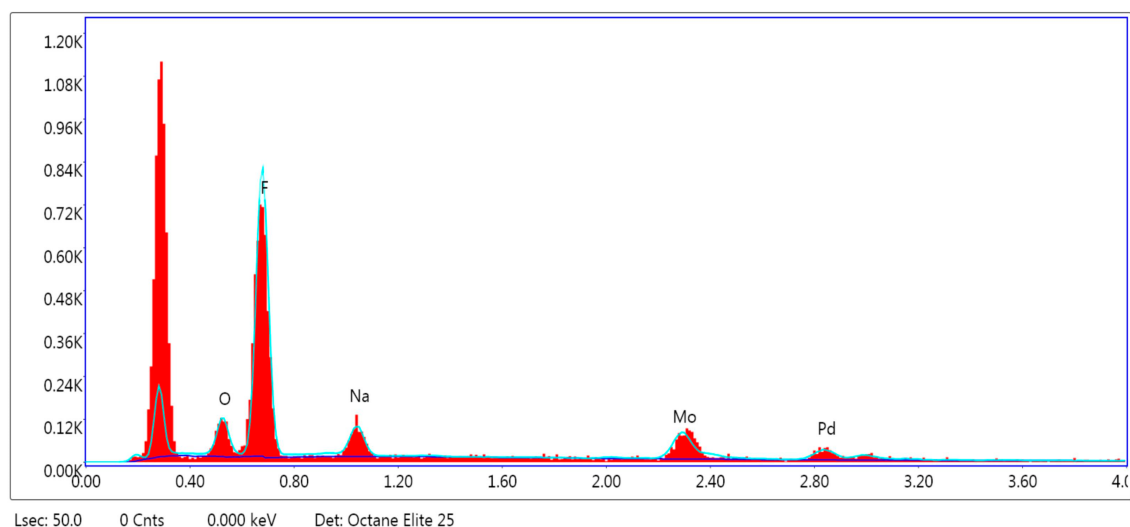
(b)

Neutral Anolyte			
Time	Voltage (V)	Oxygen Conc	Standard deviation
0	-	8.10	0.00
30	1.90	2.72	0.13
60	2.00	2.52	0.16
90	2.10	2.00	0.03
120	2.20	1.81	0.07
150	2.30	1.86	0.15

(c)

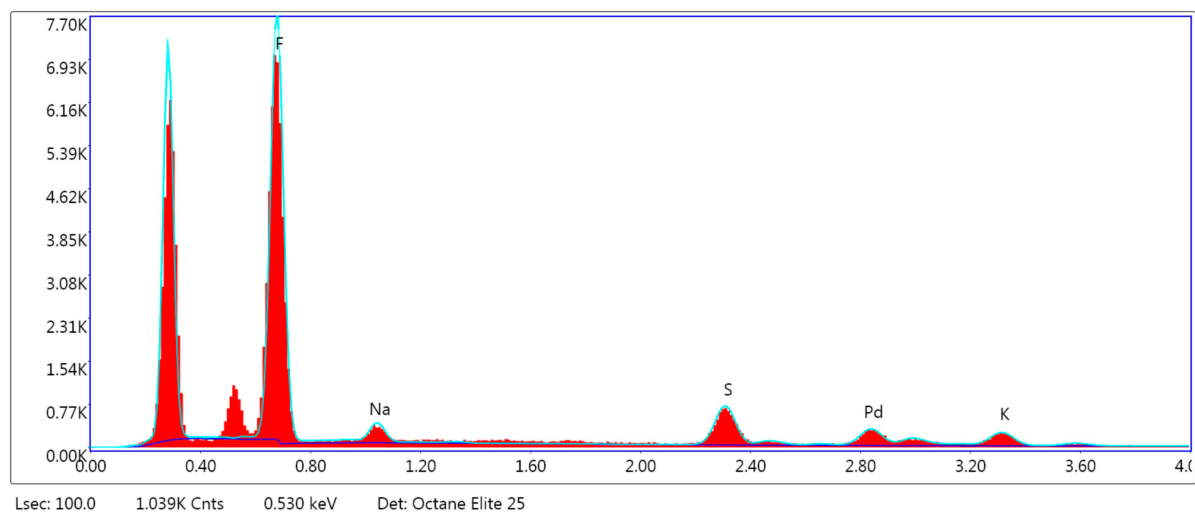
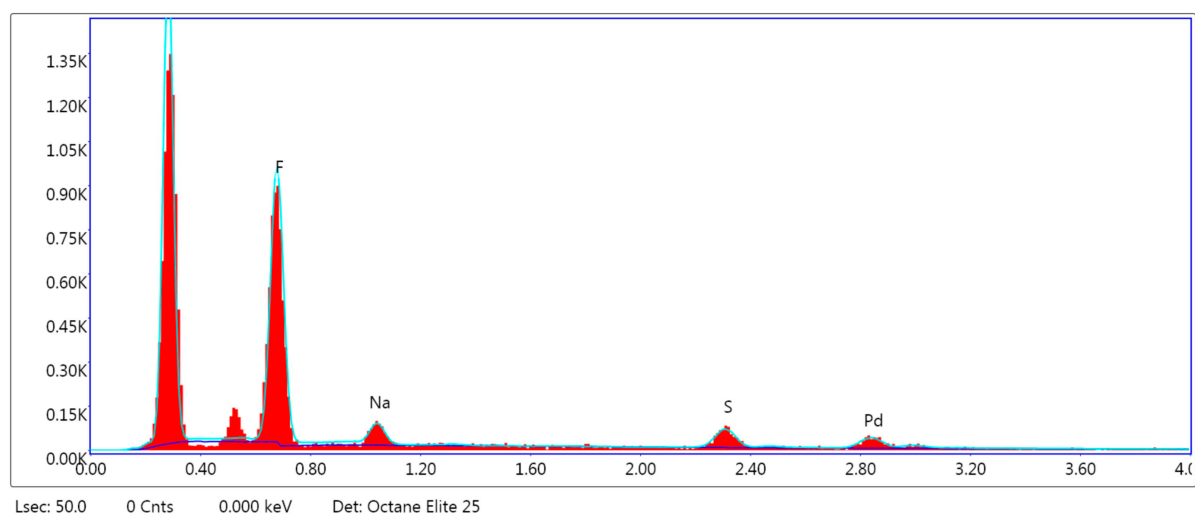
EDS Analyses

The EDS results obtained from analyses of unused and used membranes (in acidic, alkaline and neutral anolytes) are presented here. Several areas of the membrane were analyzed by EDS and some of these results are shown here. The EDS analyses showed a decrease in the carbon content for the membranes exposed to acidic or alkaline solution, while the fluorine content increased for all solutions compared to unused membranes. The oxygen content was relative stable. These values give only an indication as analyses of elements with low atomic weight have a significant uncertainty in EDS measurements. In addition, it was noticed that the elemental analysis values deviate slightly depending on which part of the membranes that was analyzed. EDS analyses will be one important analysis combined with other relevant methods as e.g. elemental analyses in order to monitor and study our long-term testing (pilot scale) of the deoxygenation unit.



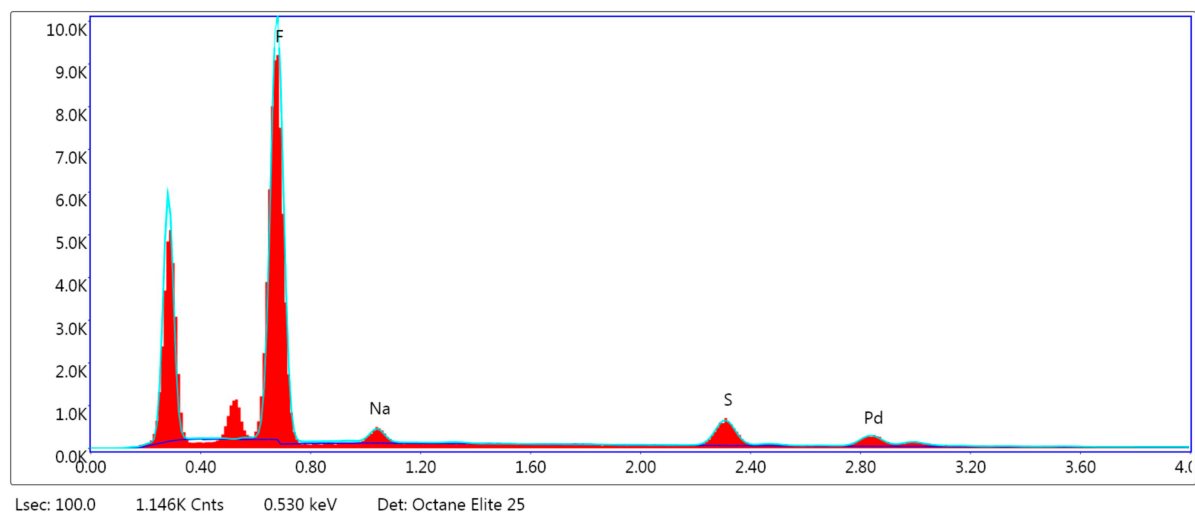
Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
O K	6.08	9.95	9.20	19.70	0.0355	1.2029	0.4846	1.0000
F K	51.54	70.96	96.32	8.18	0.3242	1.1140	0.5646	1.0000
NaK	9.08	10.34	11.64	15.02	0.0558	1.0821	0.5669	1.0011
MoL	21.34	5.82	14.21	12.50	0.1672	0.7765	1.0078	1.0012
PdL	11.95	2.94	5.64	23.75	0.0884	0.7503	0.9867	0.9991

Figure S3. EDS analyses with element analyses of unused membrane.



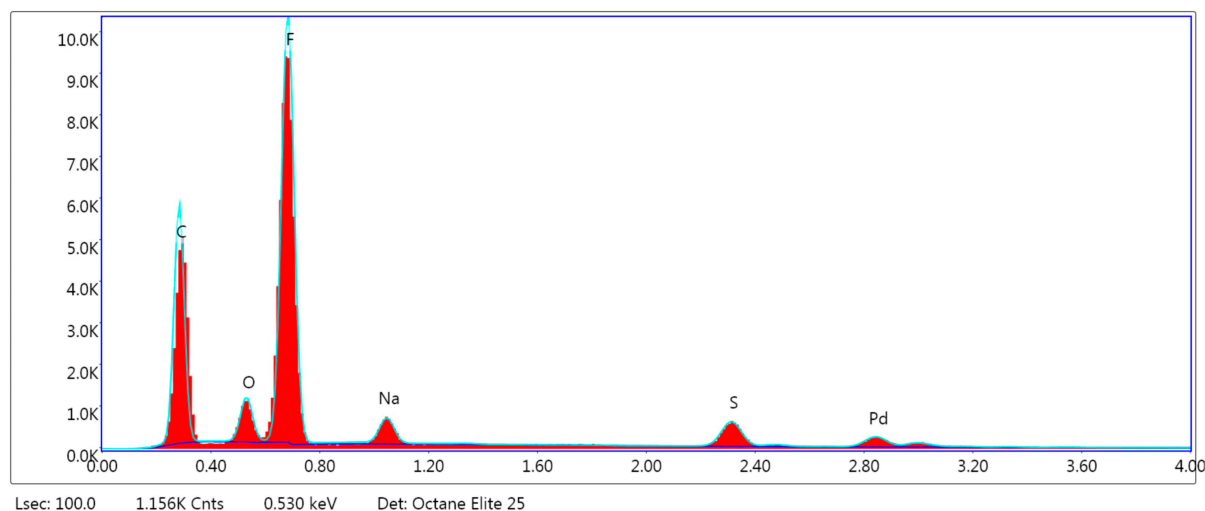
Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
F K	58.18	76.10	459.56	6.25	0.3883	1.0778	0.6191	1.0000
NaK	4.48	4.84	22.18	12.26	0.0267	1.0460	0.5687	1.0013
S K	12.64	9.80	65.84	4.75	0.1230	1.0116	0.9485	1.0138
PdL	16.01	3.74	30.00	9.02	0.1179	0.7229	1.0167	1.0015
K K	8.69	5.52	24.92	7.93	0.0793	0.9503	0.9577	1.0034

(a)



Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
F K	69.55	84.11	596.39	5.21	0.5270	1.0596	0.7151	1.0000
NaK	4.51	4.51	20.65	13.74	0.0260	1.0278	0.5597	1.0011
S K	11.53	8.26	56.08	5.50	0.1098	0.9931	0.9473	1.0115
PdL	14.41	3.11	25.26	12.62	0.1039	0.7094	1.0179	0.9992

(b)



Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	31.35	45.12	199.23	99.99	0.1612	1.1196	0.4593	1.0000
O K	5.46	5.90	54.76	9.78	0.0280	1.0585	0.4833	1.0000
F K	45.40	41.30	607.35	6.25	0.2707	0.9790	0.6090	1.0000
NaK	4.22	3.18	39.95	9.20	0.0254	0.9487	0.6321	1.0011
S K	6.10	3.29	55.36	5.28	0.0546	0.9150	0.9681	1.0113
PdL	7.47	1.21	24.46	11.93	0.0507	0.6531	1.0409	0.9995

(c)

Figure S4. EDS analyses with element analyses of used membrane exposed to (a) alkaline, (b) acidic and (c) neutral solutions.