Supplementary Information (SI) for Journal of Materials Chemistry A.

Enhancing the Electrochemical Catalytic Performance of Novel Bifunctional Oxygen Vacancy-Enriched Silver Niobate ($AgNbO_3$) through Electrochemical Activation

Deepak Rajaram Patil[1], Harish S. Chavan[1], Ah-yeong Lee[1], Geon Lee[2], Jungho Ryu[2], Younggon Son[1], Kiyoung Lee*[1],

[1]Department of Chemistry and Chemical Engineering, Inha University, 100 inha-ro, Michuhol-gu, 22212 Incheon, Republic of Korea

[2]School of Materials Science and Engineering, Yeungnam University, Gyeongsan, Gyeongbuk 38541, Republic of Korea

Figure S1 Photograph of ANO film fabricated by aerosol deposition technique.

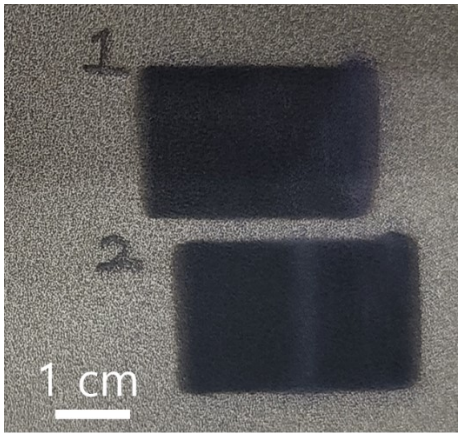
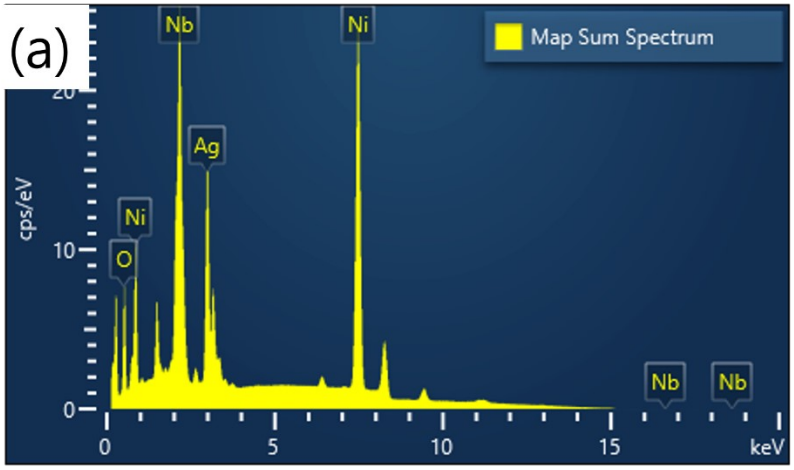


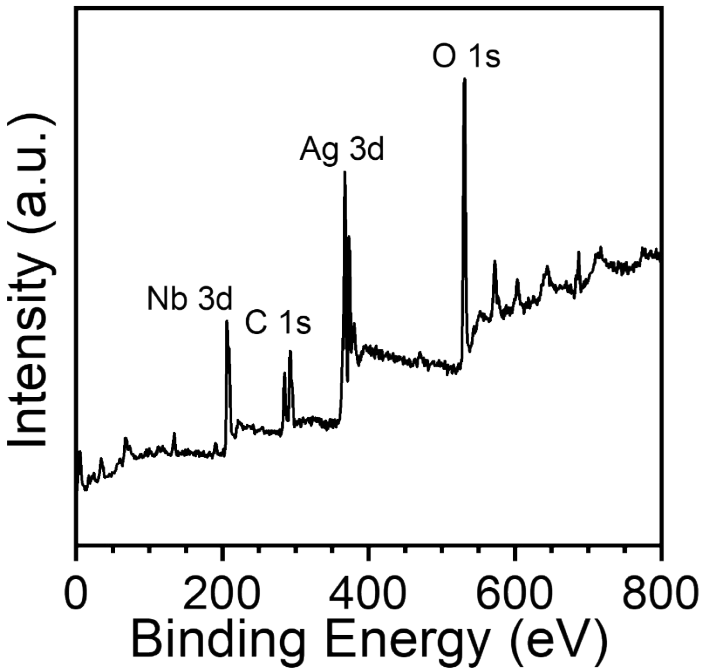
Figure S2 (a) The EDS spectrum for ANO electrode, (b) detailed elemental composition outlined in Table S1.



(b)

Map Sum Spectrum		
Element	Wt%	Atomic %
O	6.74	23.35
Ni	64.13	60.53
Nb	13.95	8.32
Ag	15.18	7.80
Total:	100.00	100.00

Figure S3 Survey spectrum and elemental composition of ANO film.



Map Sum Spectrum	
Element	Atomic %
Ag	4.78
Nb	4.81
O	40.61
C	49.8
Total:	100.00

Figure S4 (a) Electrochemical activation of ANO film through Cyclic voltammetry. (b) Raman spectra of ANO film following different CV cycles. (c) Electrochemical activation of RuO_2 film throug CV. (d) LSV curves of Ni foam following different CV cycles.

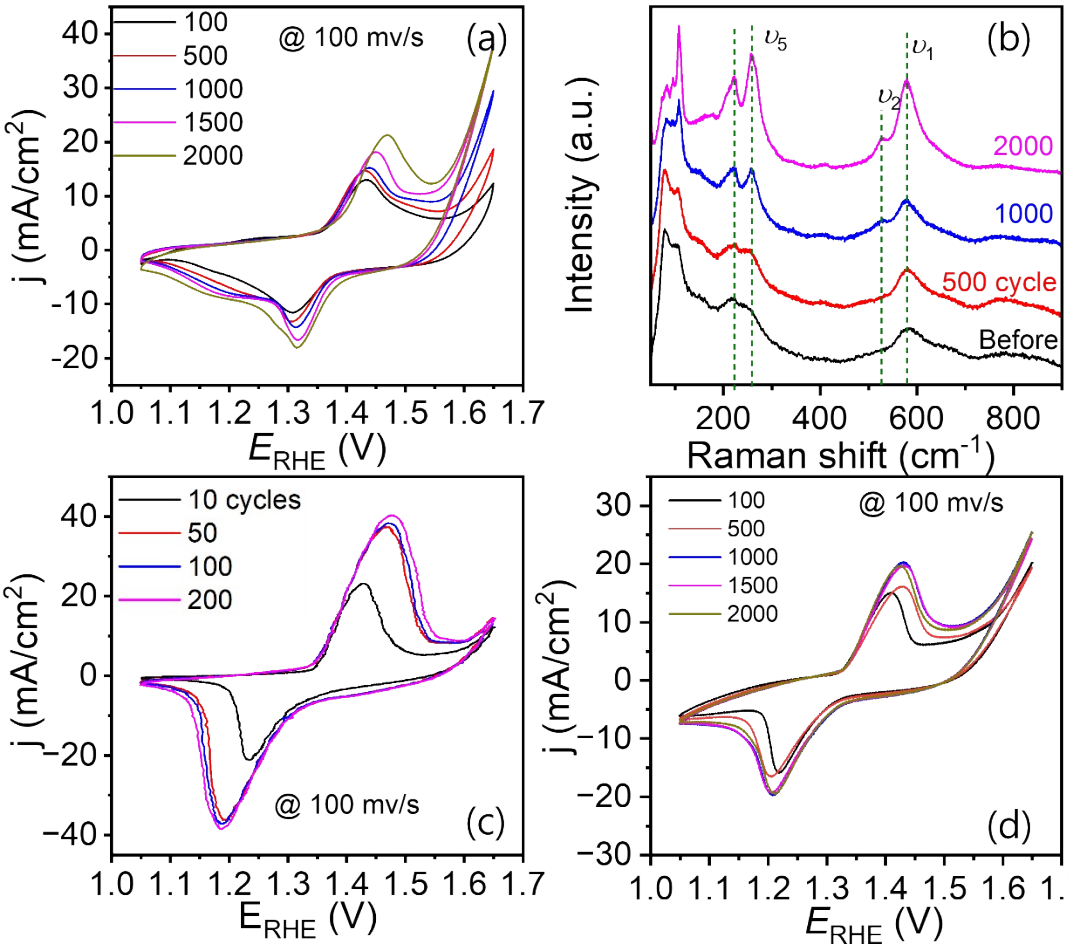
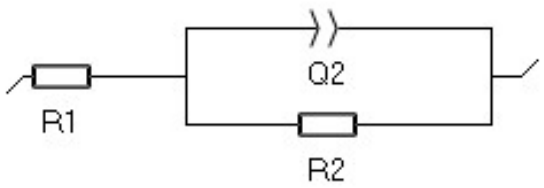


Table S1 Equivalent circuit diagram used for modelling of Nyquist curves and Table showing fitted resistance values.



No of cycles	R1 (Ω)	R2 (Ω)
1.698	1.707	86.78
500	1.414	11.11
1000	1.421	5.92
1500	1.461	3.453
2000	1.679	3.018

Figure S5 (a) Cyclic voltammetry (CV) curves of ANO electrocatalysts at different scan rates to determine ECSA. (b) electrochemical double-layer capacity (C_{dl}) of ANO

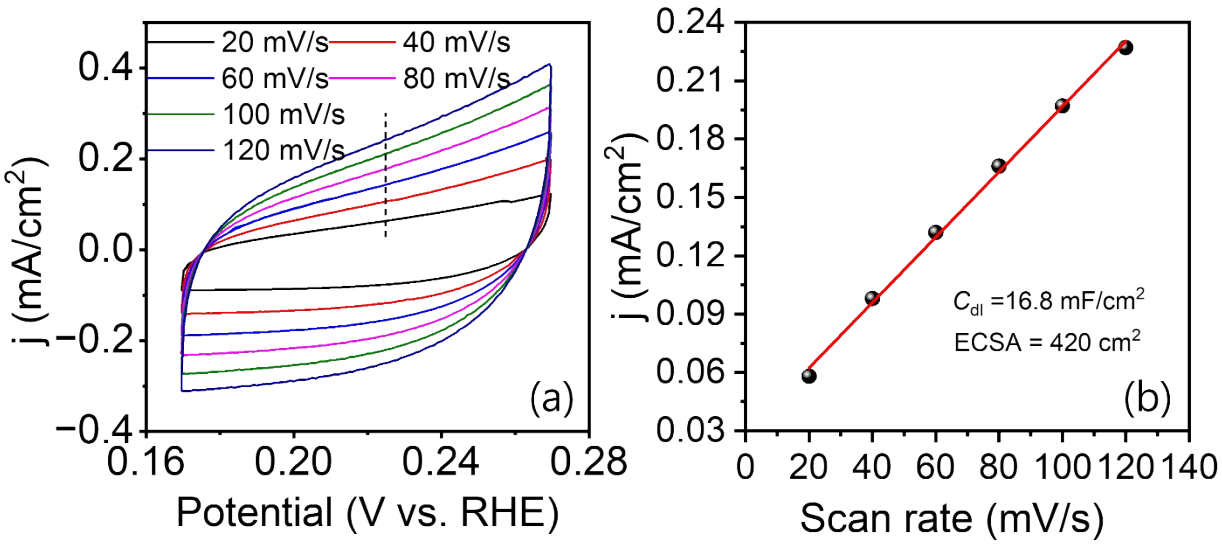


Fig S6 Stability test of ANO electrocatalysts at current density of 100 mA cm^{-1} over 75 hours.

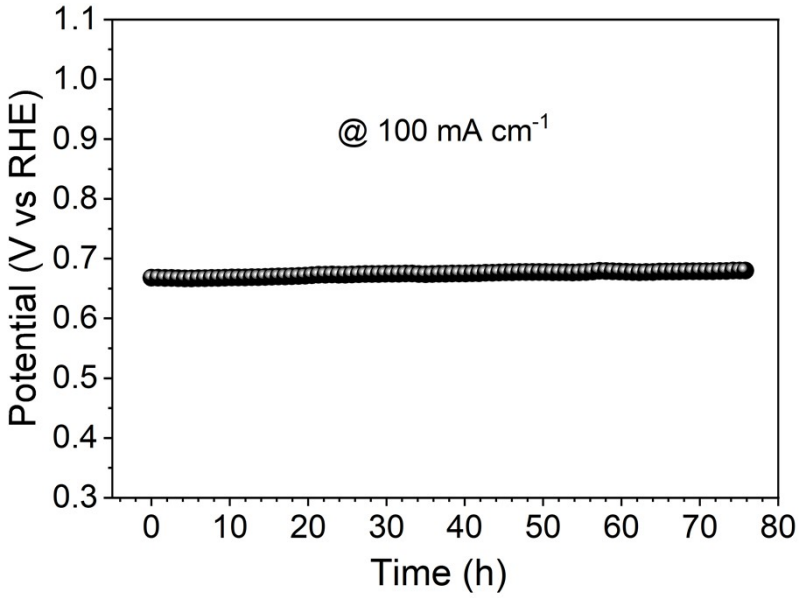


Figure S7 Photograph of water electrolyzer employing ANO electrodes as both the anode and cathode in a 1 M KOH electrolyte.