Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supporting Information

Formation of Prussian Blue Analog Coronal Nanomaterials and their Conversion into Mn–Co-Mixed Selenide for Enhanced Electrocatalytic Oxygen Evolution

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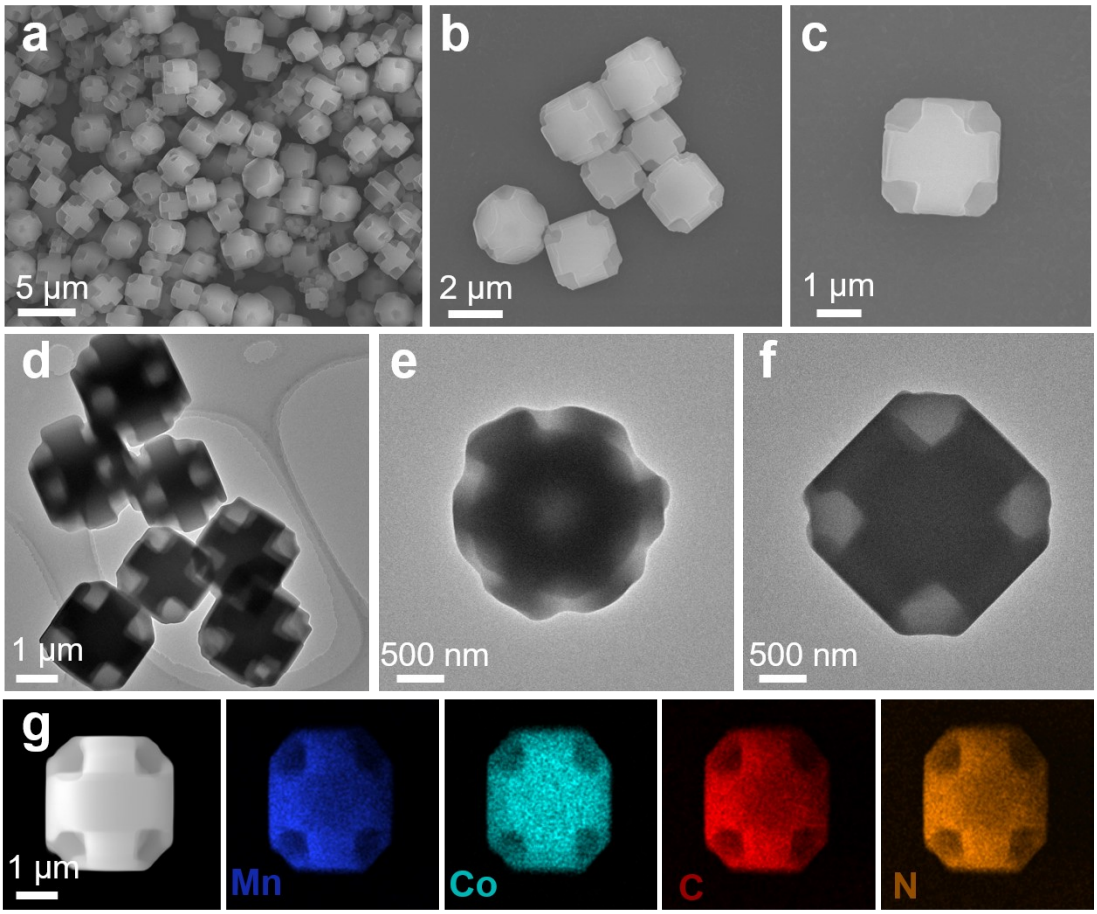
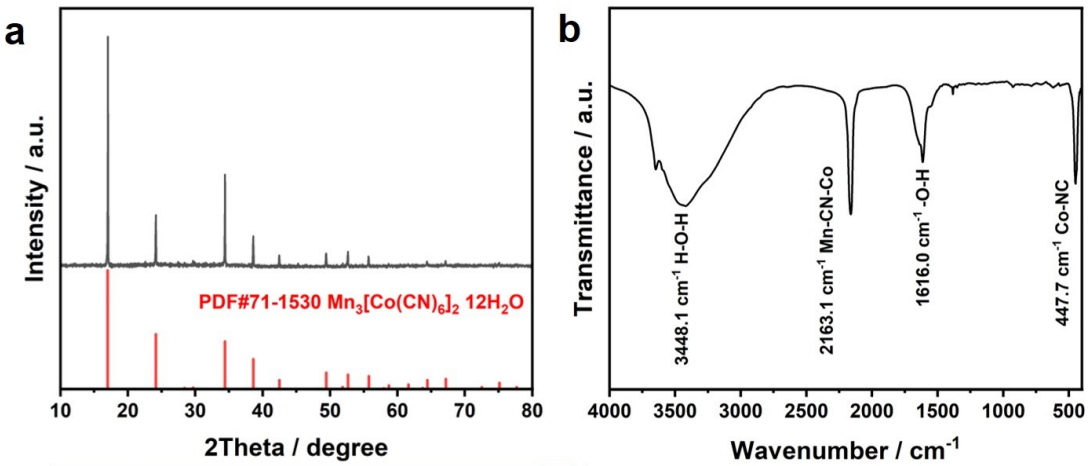


Fig. S1 a-c) FESEM images, d-f) TEM images of the cross MnCo PBA, and g) Scanning TEM (STEM) image and the corresponding elemental mapping images of a typical cross MnCo PBA.



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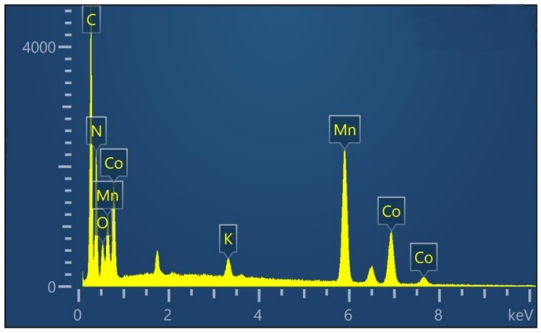
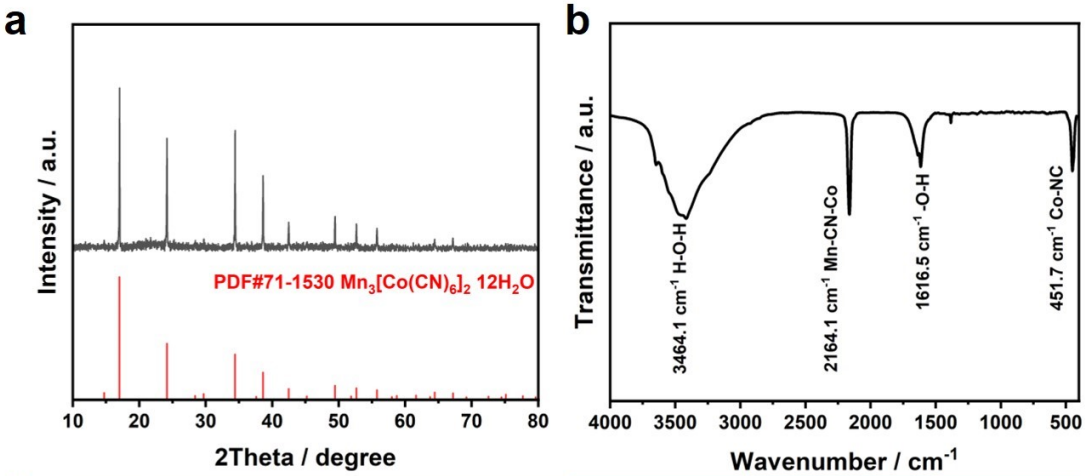


Element	Wt%	At%
C	27.13	45.07
N	24.61	35.07
O	2.96	3.69
K	1.05	0.53
Mn	26.45	9.61
Co	17.81	6.03

Fig. S2 a) XRD, b) FTIR, and c) EDS spectra of the cross MnCo PBA.



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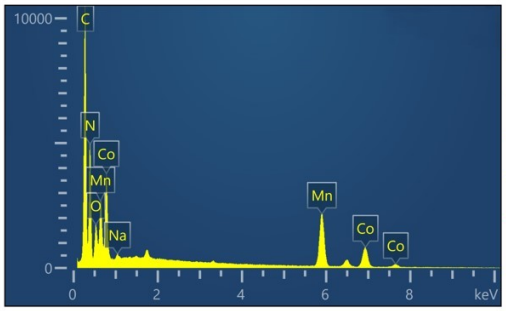


Element	Wt%	At%
C	30.90	43.19
N	35.24	42.23
O	5.78	6.07
Na	0.36	0.26
Mn	16.95	5.18
Co	10.77	3.07

Fig. S3 a) XRD, b) FTIR, and c) EDS spectra of the coronal MnCo PBA.

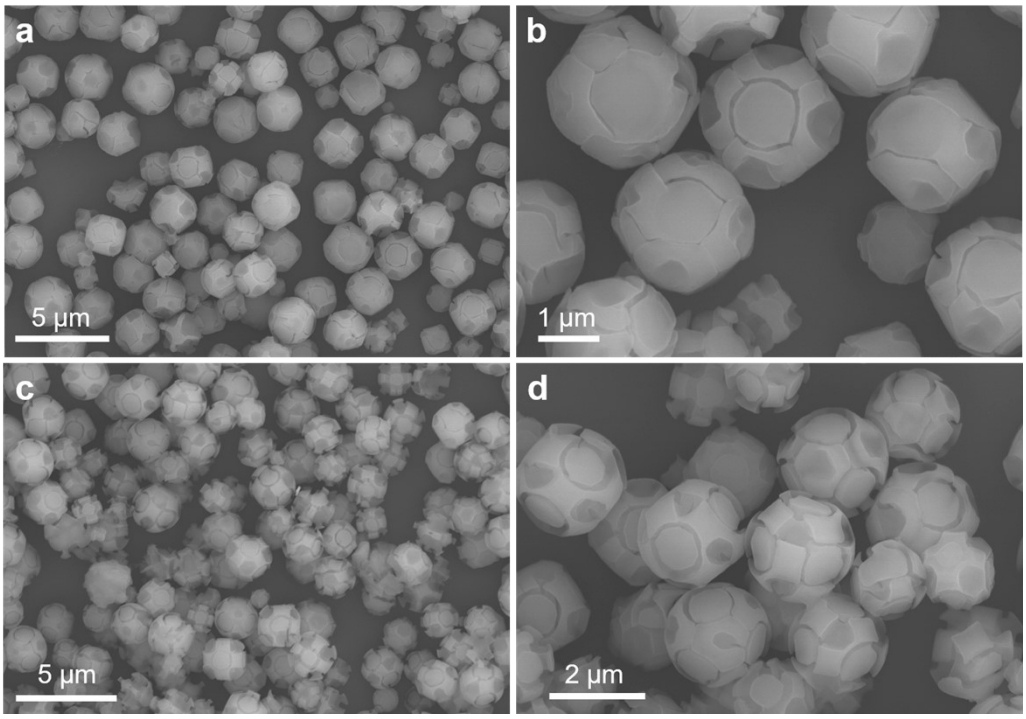


Fig. S4 FESEM images of MnCo PBA when the concentration of sodium citrate is a,b) 0.05 mmol L^{-1} and c,d) 0.1 mmol L^{-1}.

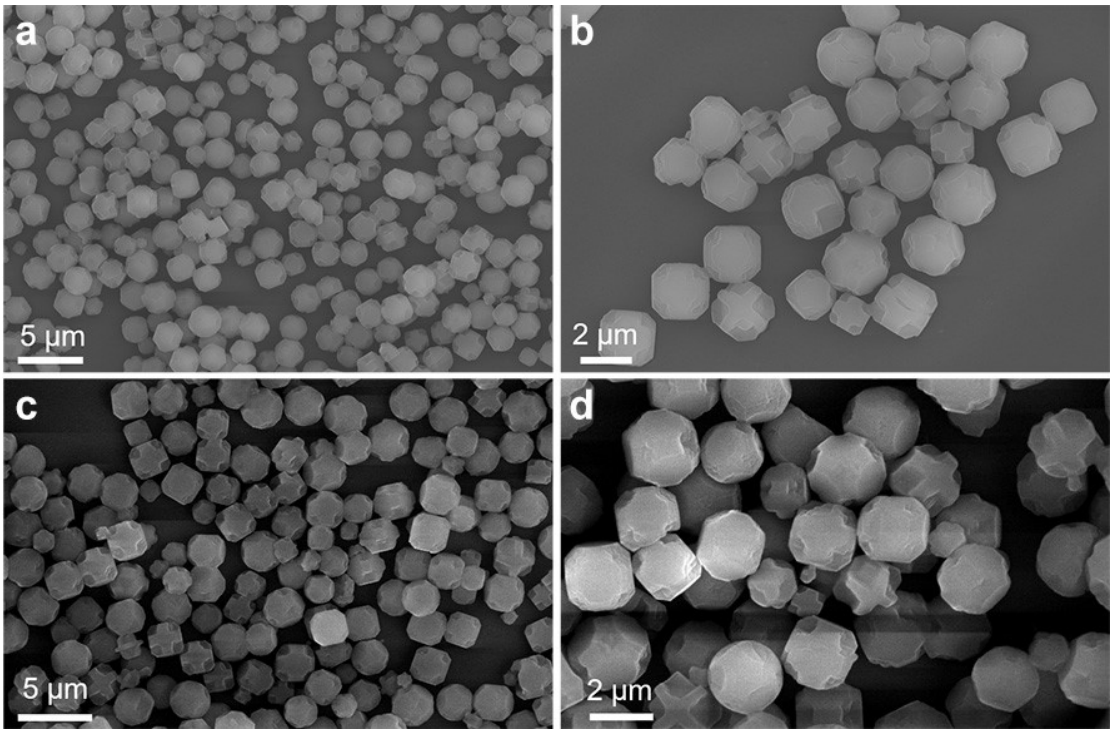


Fig. S5 FESEM images of cross MnCo PBA treated with a,b) Na_2SO_4, and c,d) NaOH.

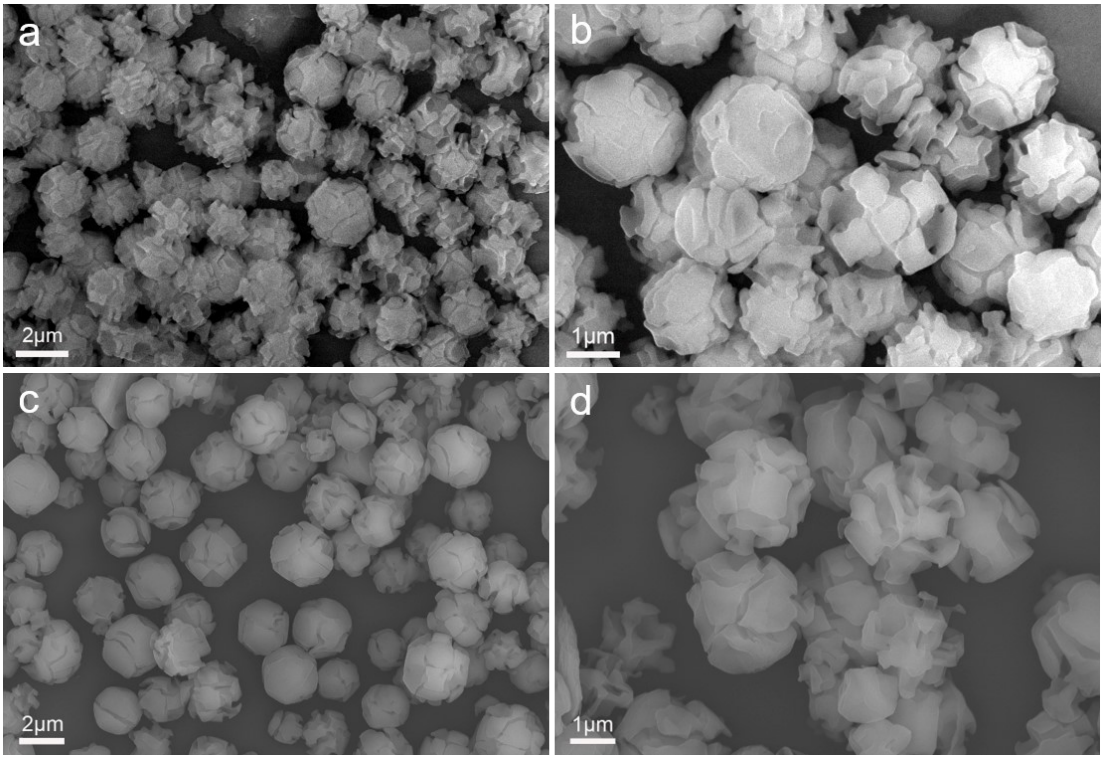


Fig. S6 FESEM images of cross MnCo PBA treated with a,b) potassium citrate and c,d) EDTA·2Na.

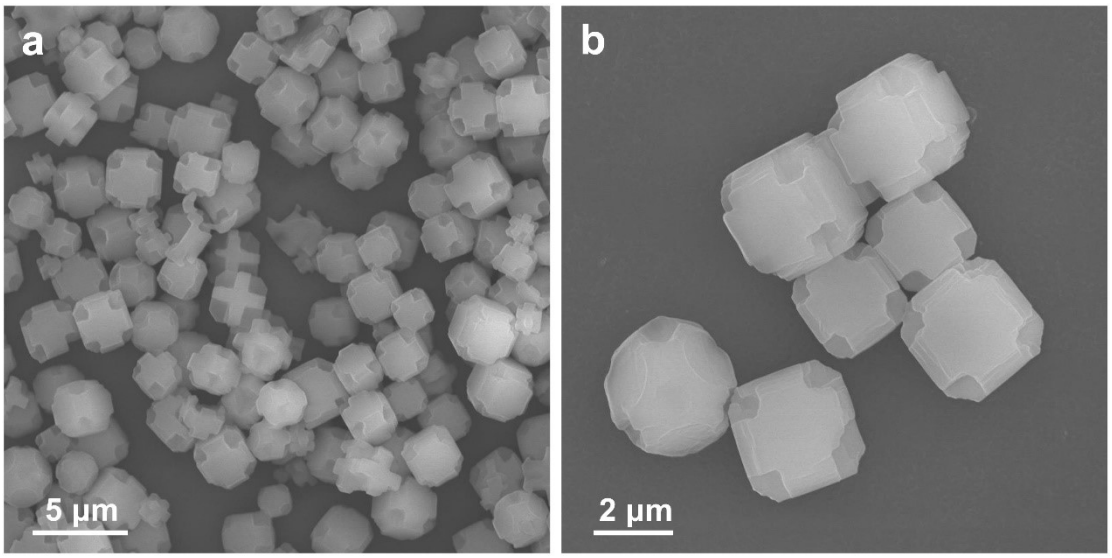


Fig. S7 FESEM images of cross MnCo PBA treated with citric acid.

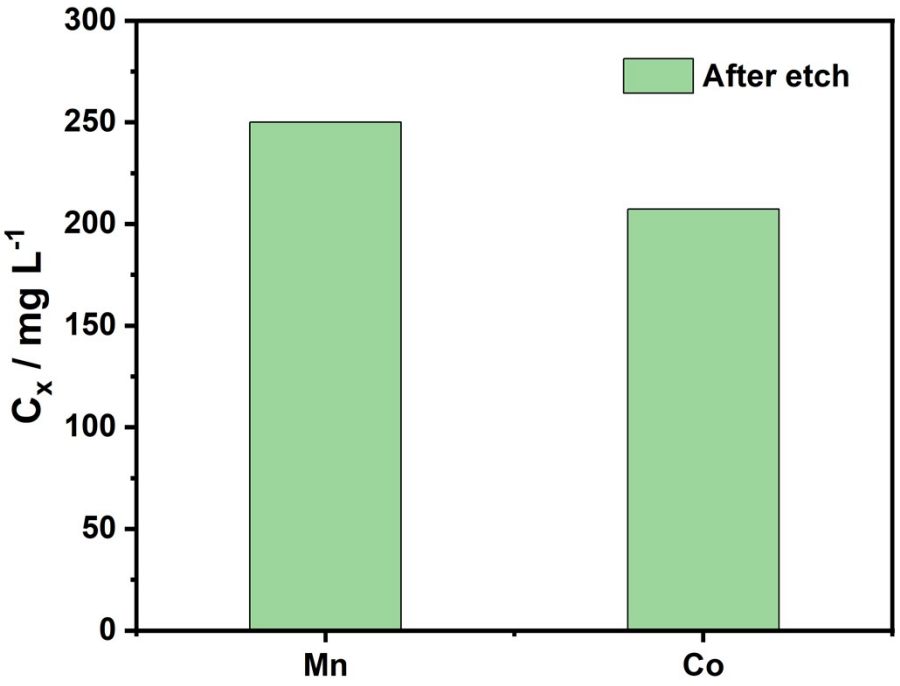


Fig. S8 ICP test result of sodium citrate etched solution supernatant.

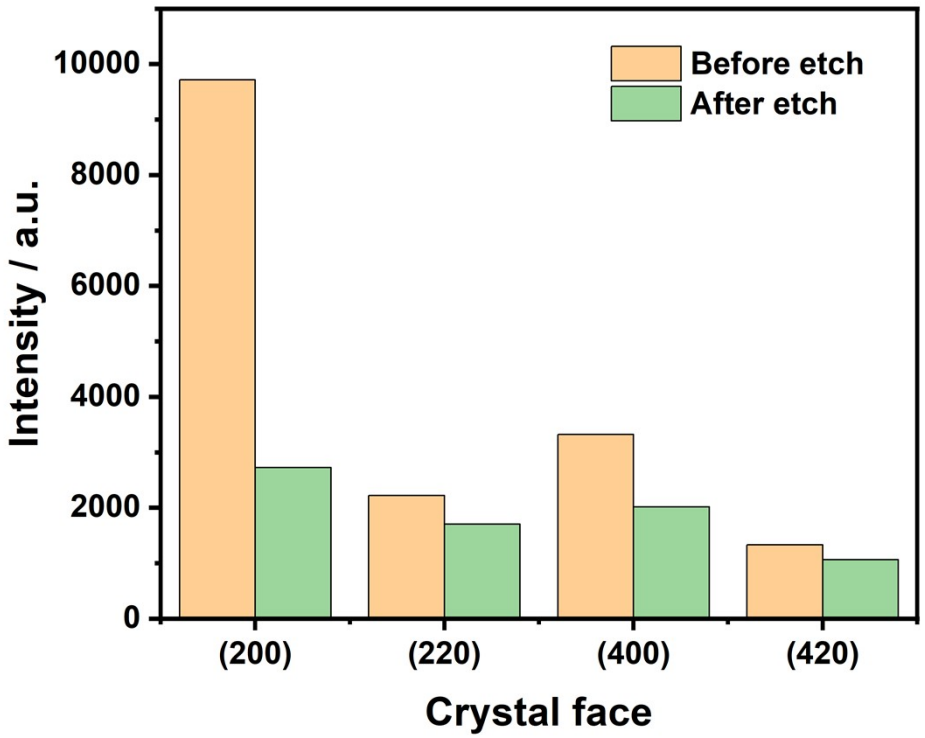


Fig. S9 The change of the strength of each crystal face before and after etching.

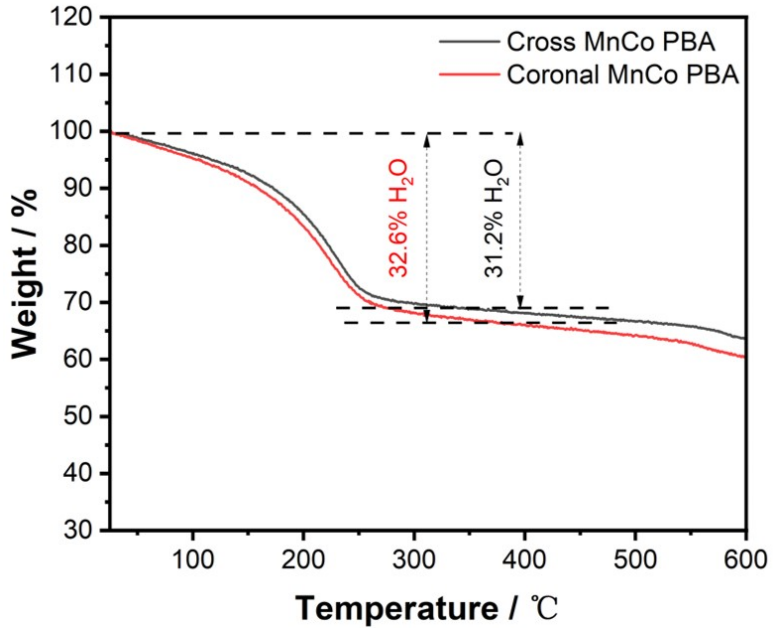


Fig. S10 TGA curves of coronal MnCo PBA and cross MnCo PBA in N_2 in the temperature range from 25 to 600 ℃ with a heating rate of 5 ℃ min^{-1}.

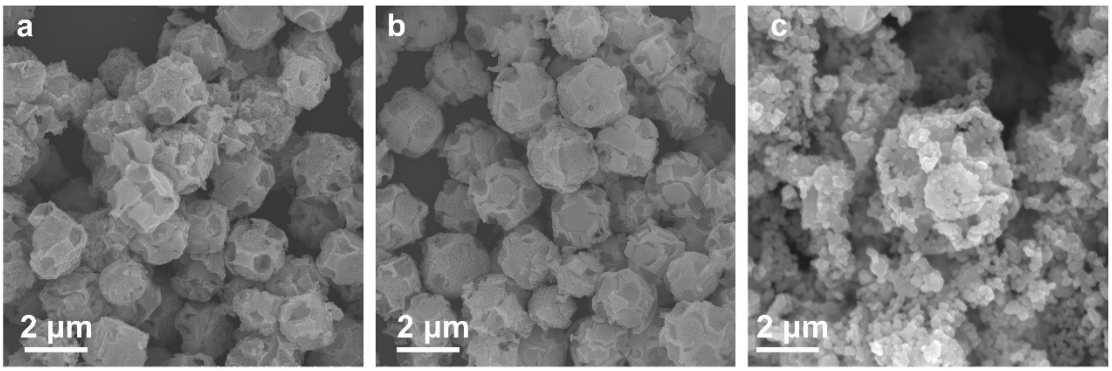


Fig. S11 FESEM images of the product at different selenization temperatures. a) 350 ℃, b) 400 ℃, and c) 450 ℃.

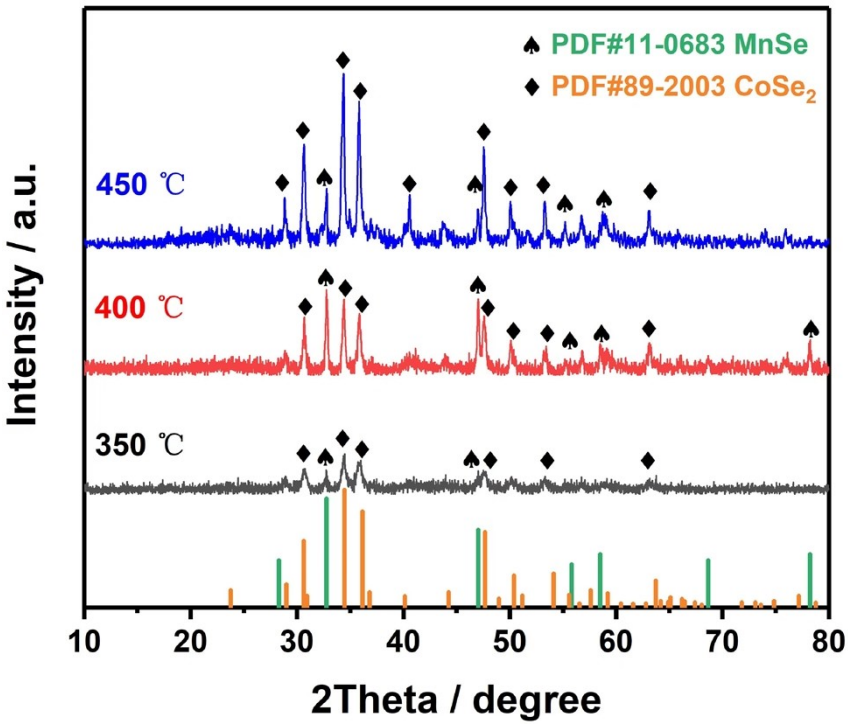
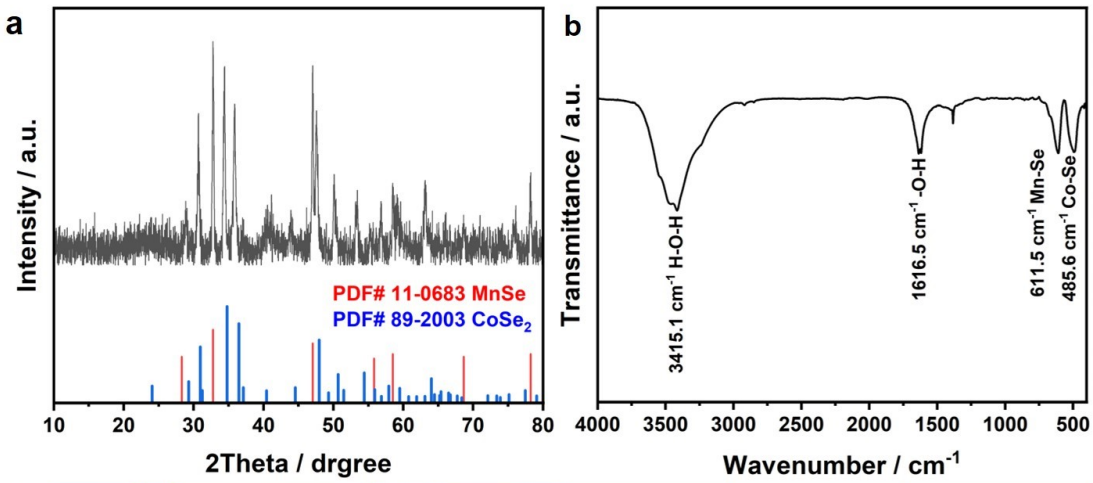


Fig. S12 XRD spectra of products at different selenization temperatures.



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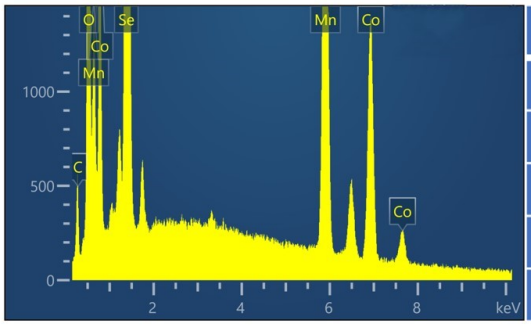


Element	Wt%	At%
C	12.25	28.94
O	5.03	18.41
Mn	29.17	21.56
Co	20.32	14.00
Se	33.23	17.09

Fig. S13 a) XRD, b) FTIR, and c) EDS spectra of the coronal $MnSe/CoSe_2$.

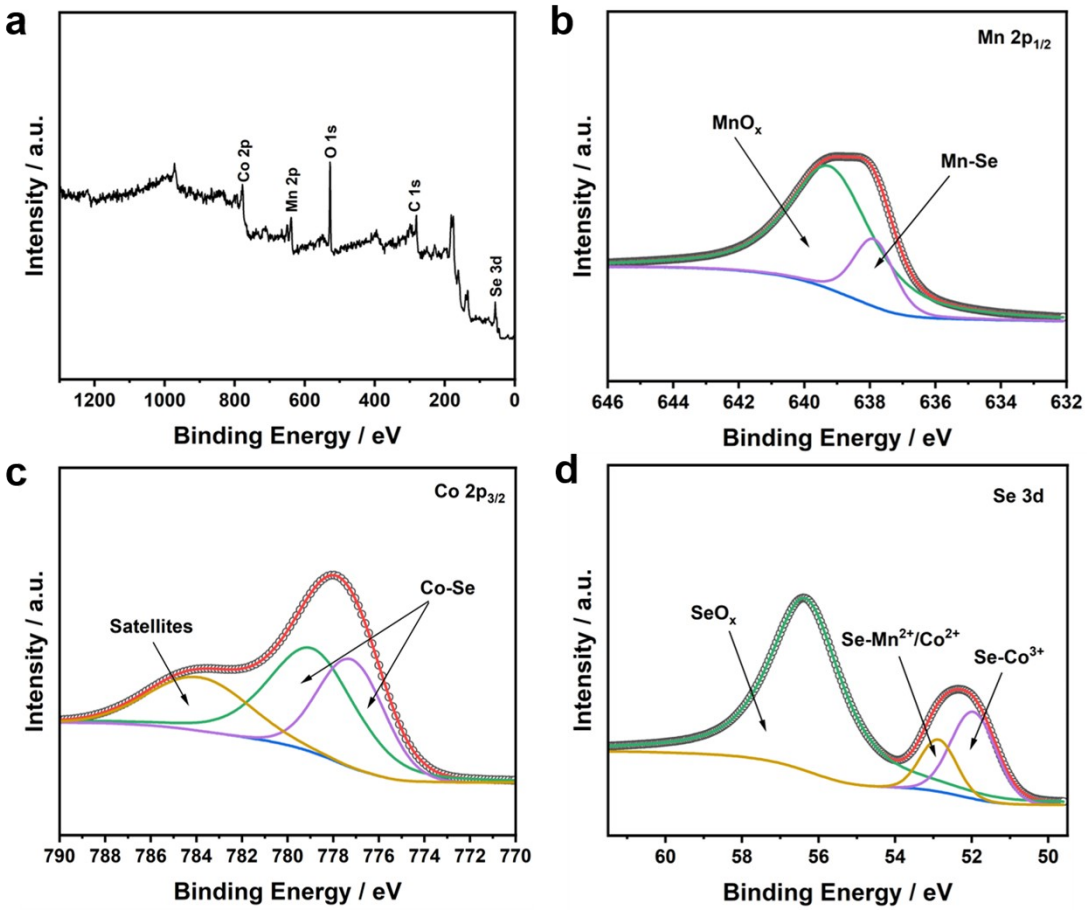


Fig. S14 a) XPS survey spectrum for the coronal MnSe/$CoSe_2$. High-resolution XPS spectra of b) Mn $2p_{1/2}$, c) Co $2p_{3/2}$, and d) Se 3d for the coronal MnSe/$CoSe_2$.

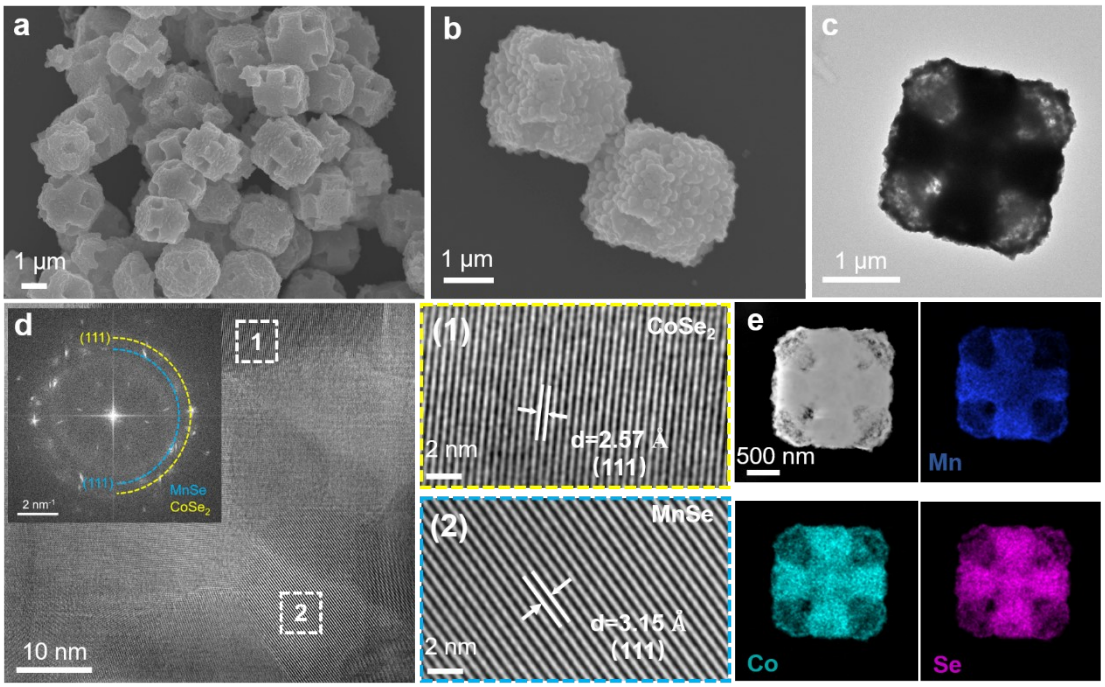
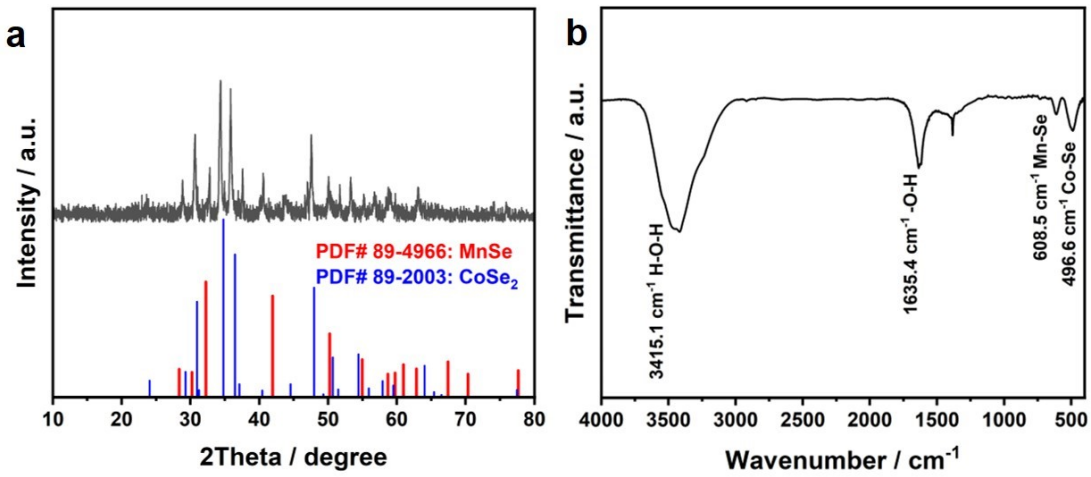


Fig. S15 a,b) FESEM images, c) TEM image, d) HRTEM image, inset: the corresponding FFT pattern, (1) and (2) the corresponding region marked in (d), and e) Scanning TEM (STEM) image and the corresponding elemental mapping images of a typical cross MnSe/$CoSe_2$.



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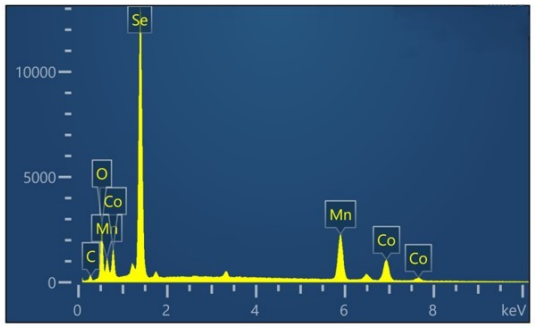


Element	Wt%	At%
C	9.98	24.01
O	3.54	16.36
Mn	22.90	19.15
Co	17.70	13.79
Se	45.88	26.69

Fig. S16 a) XRD, b) FTIR, and c) EDS spectra of the cross MnSe/$CoSe_2$.

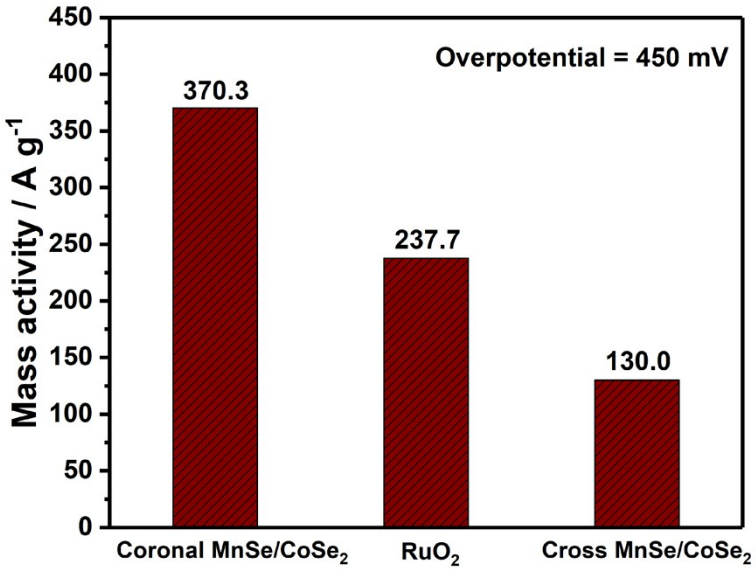


Fig. S17 Mass activities of three catalysts at the overpotential of 450 mV.

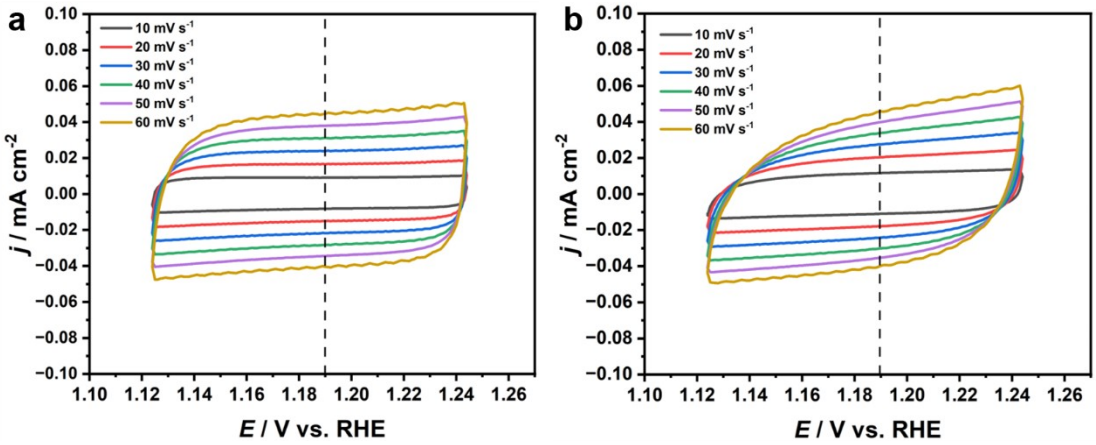


Fig. S18 CV curves at different scan rates for the a) cross $MnSe/CoSe_2$ and b) coronal $MnSe/CoSe_2$.

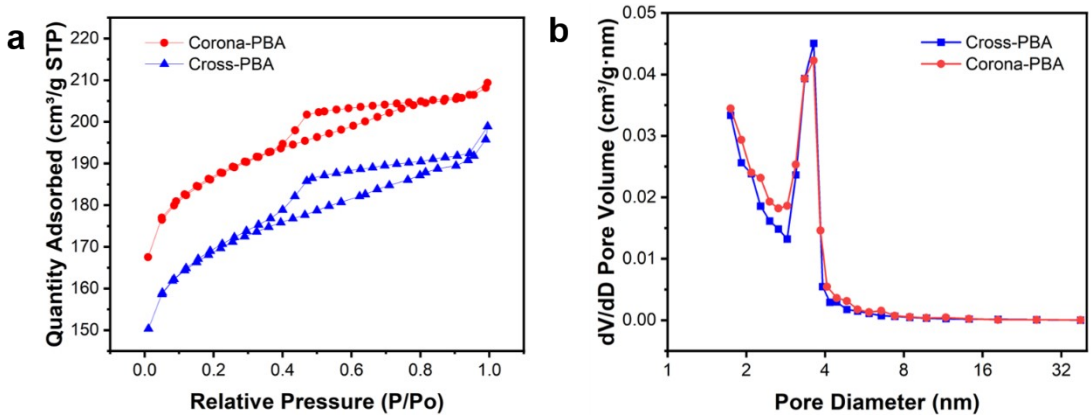


Fig. S19 a) N_2 adsorption and desorption curves of coronal and cross PBA and b) Aperture distribution of coronal PBA and cross PBA.

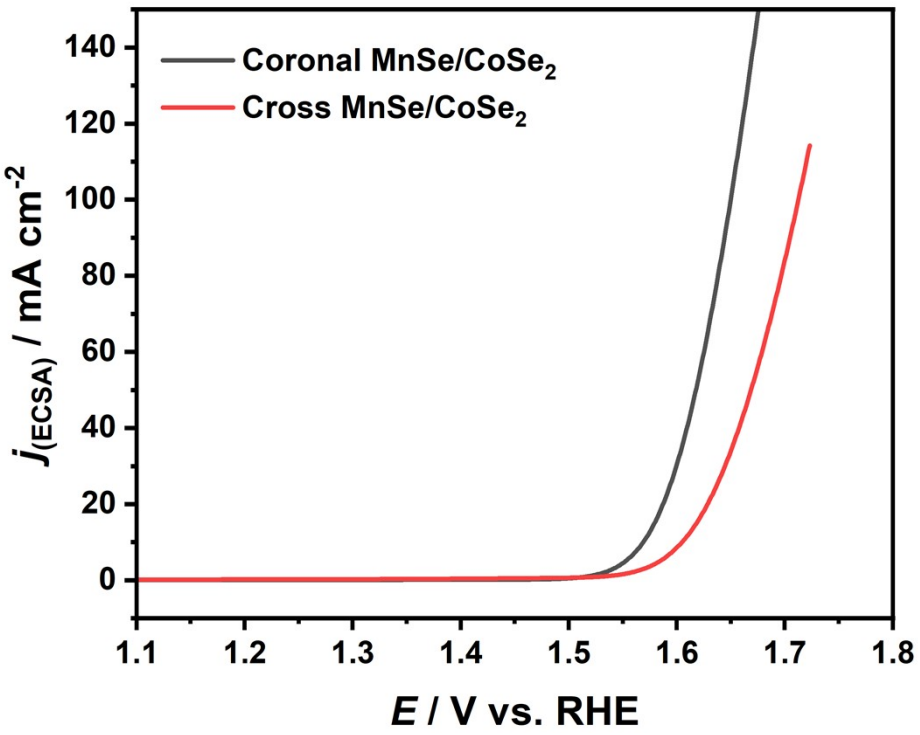
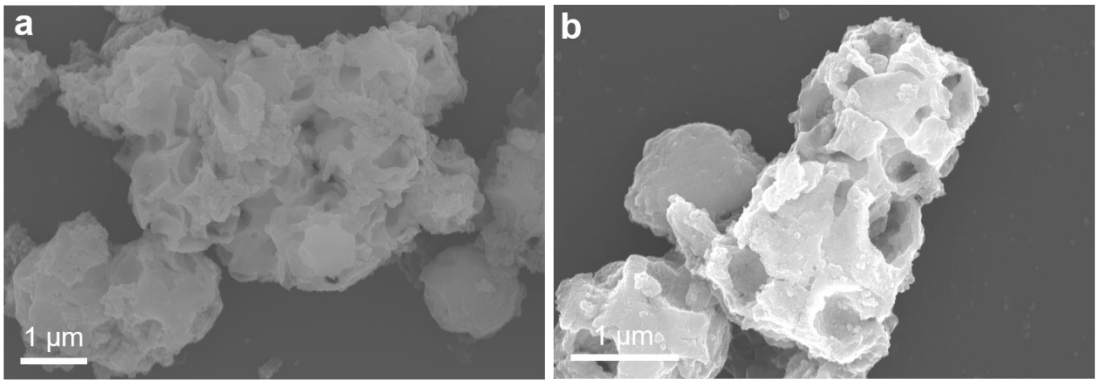
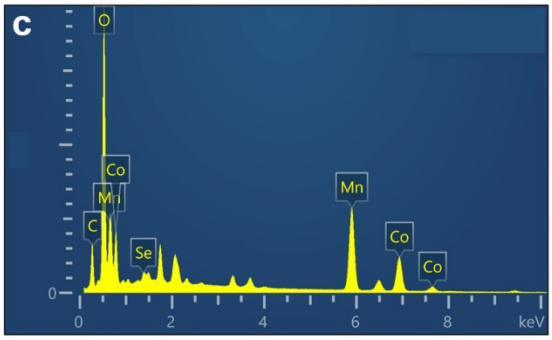


Fig. S20 The LSV curve redrawn using ECSA normalized current density.





Element	Wt%	At%
C	11.52	25.70
O	26.81	44.91
Mn	30.51	16.84
Co	25.14	11.43
Se	6.20	1.12

Fig. S21 a,b) FESEM images and c) EDS spectra of the coronal MnSe/$CoSe_2$ after the 500 cycles CV test.

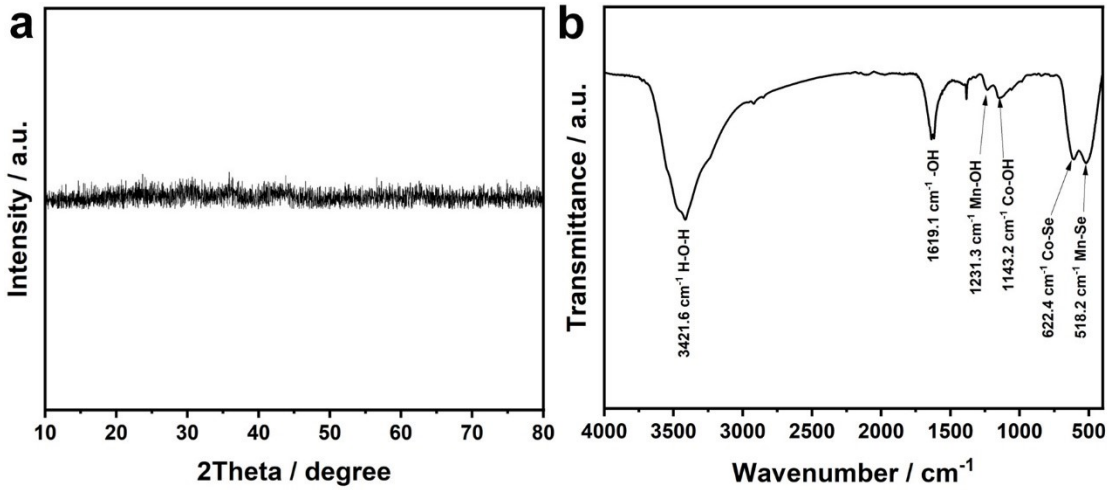


Fig. S22 a) XRD and b) FTIR spectra of the coronal MnSe/$CoSe_2$ after the CP test.

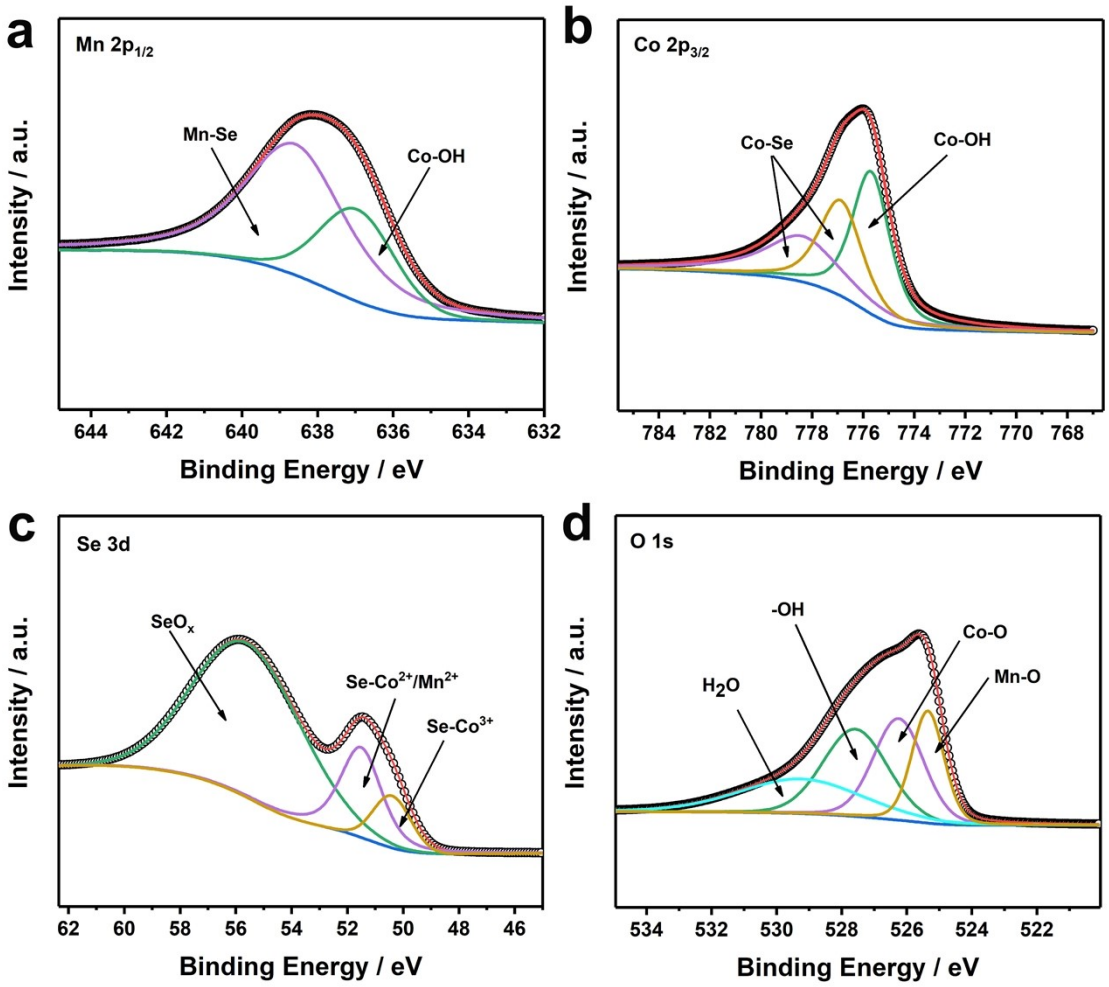


Fig. S23 High-resolution XPS spectra of a) Mn $2p_{1/2}$, b) Co $2p_{3/2}$, c) Se 3d, and d) O 1s for the coronal MnSe/$CoSe_2$ catalyst after the CP test.