Supplementary Material for

Moss-like CoB/CeO_2 heterojunction as an efficient electrocatalyst for oxygen evolution reaction under alkaline conditions

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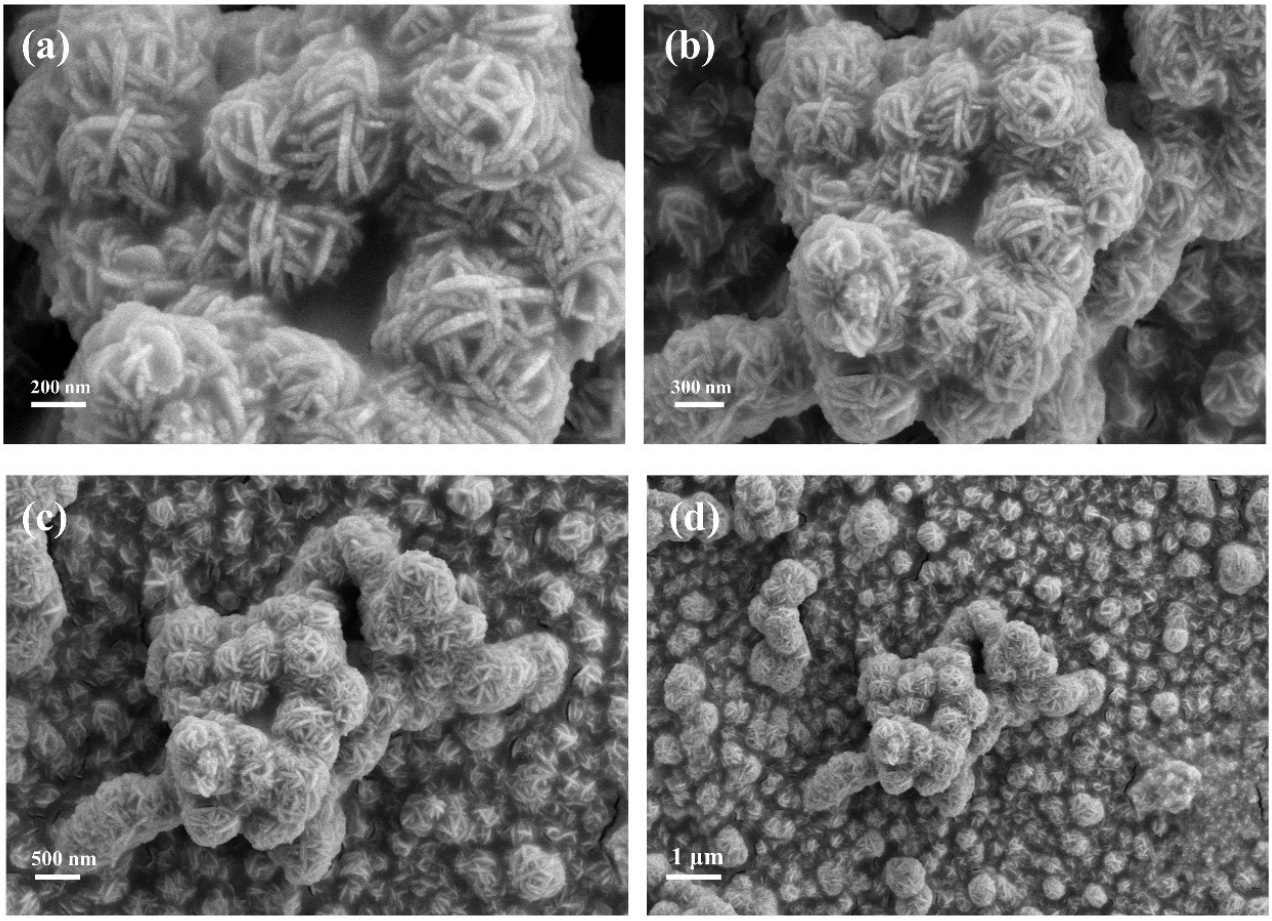

Figure S 1. SEM images of CoB at (a) 200 nm, (b) 300 nm, (c) 500 nm, and (d) 1 μm.

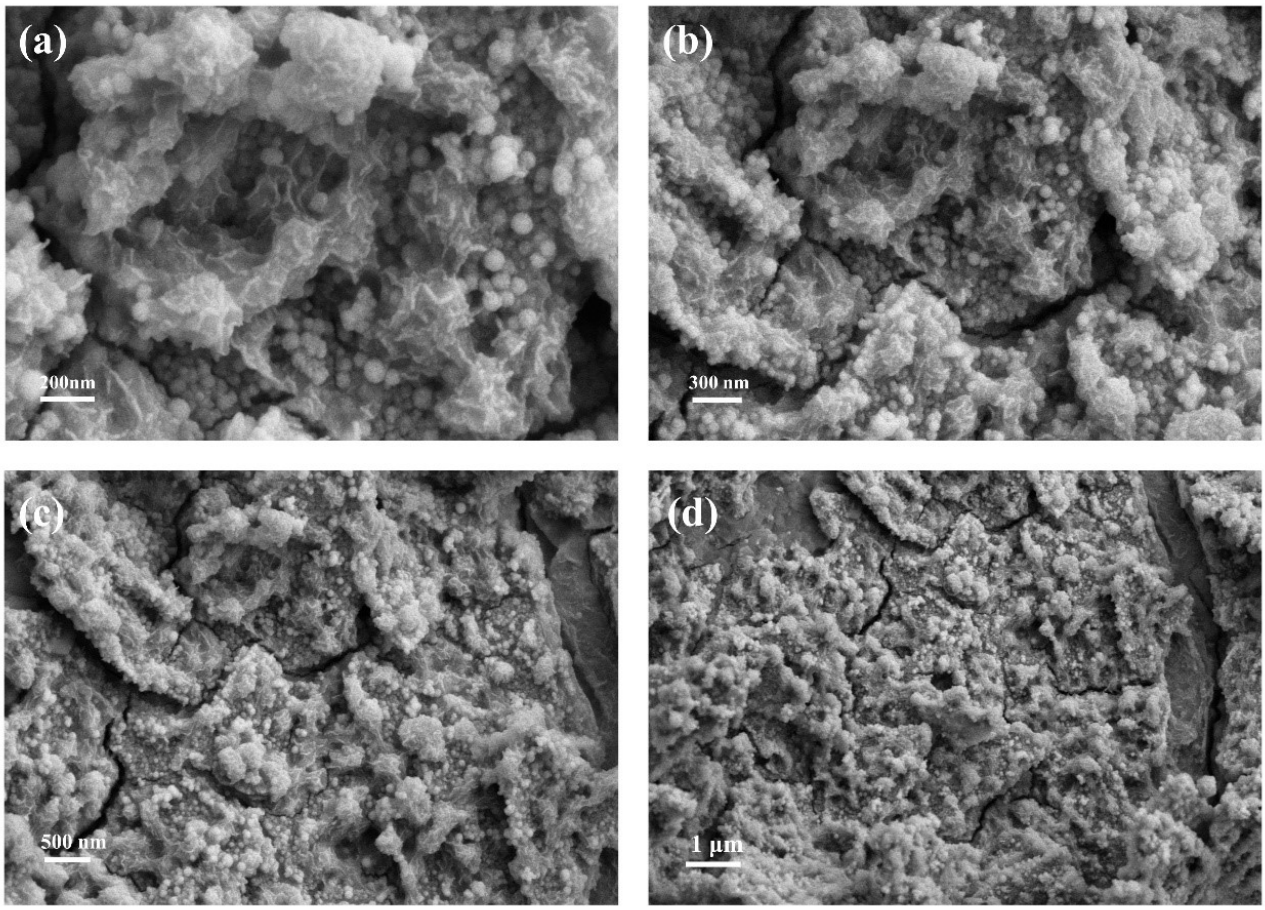

Figure S 2. SEM images of CeO_2 at (a) 200 nm, (b) 300 nm, (c) 500 nm, and (d) 1 µm.

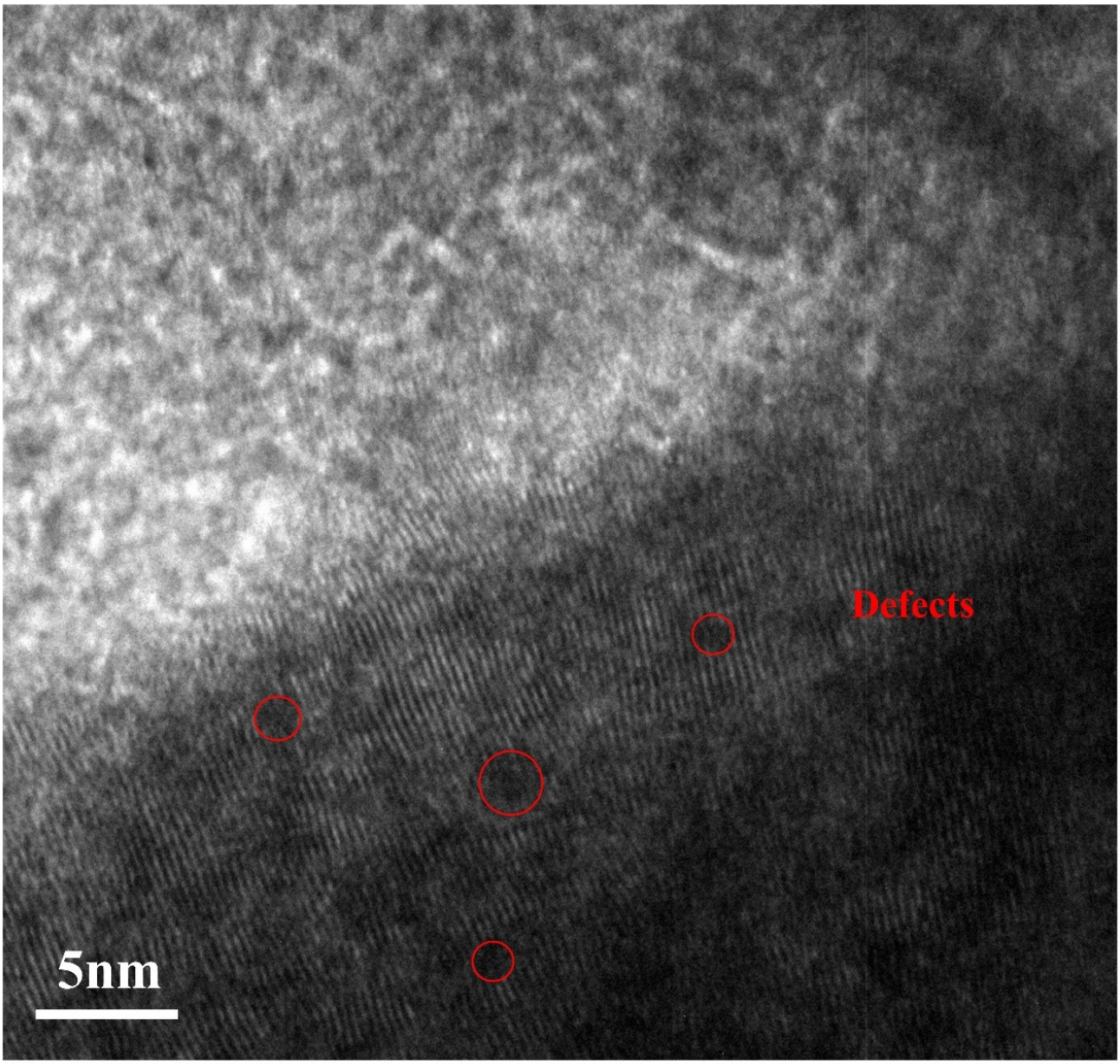

Figure S 3. HRTEM image of CoB/CeO_2 at 5 nm.

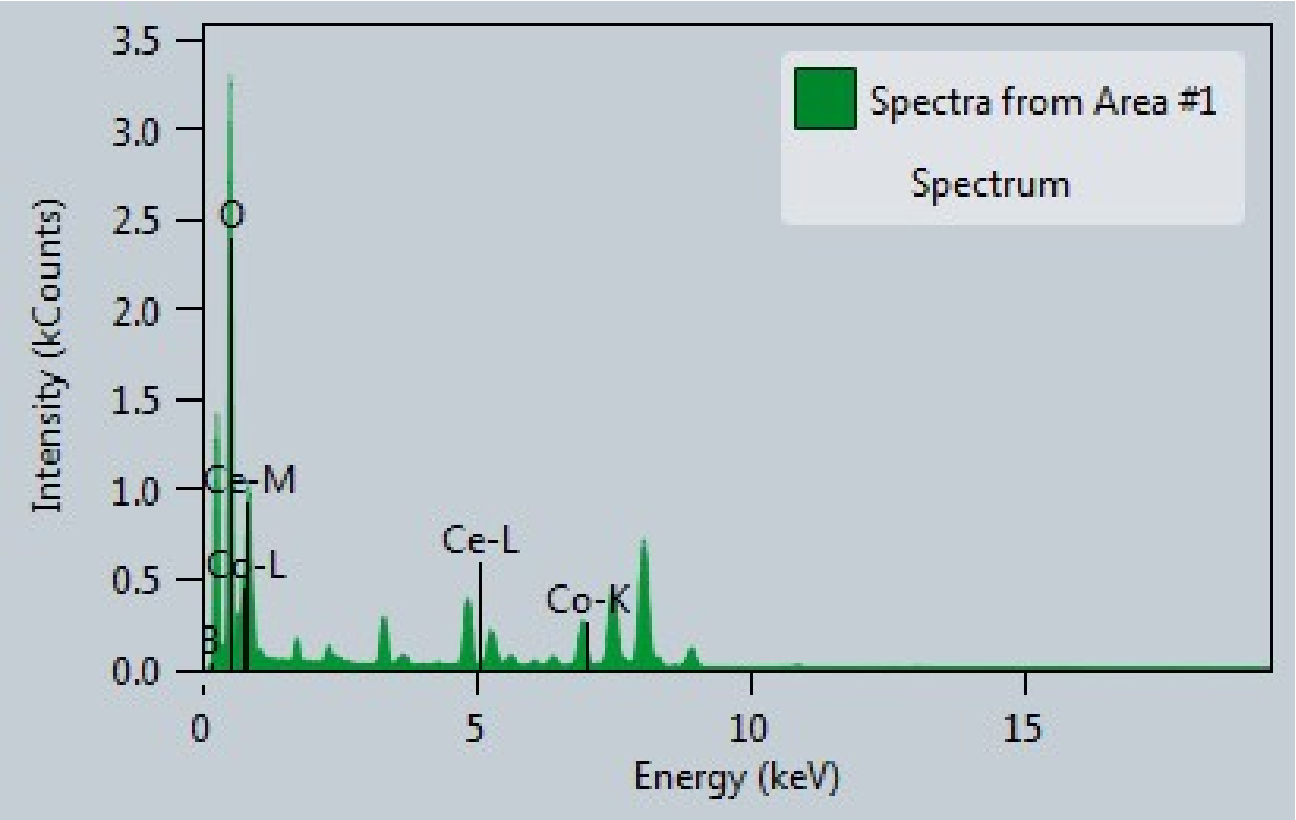

Figure S 4. EDX spectrum of CoB/CeO_2.

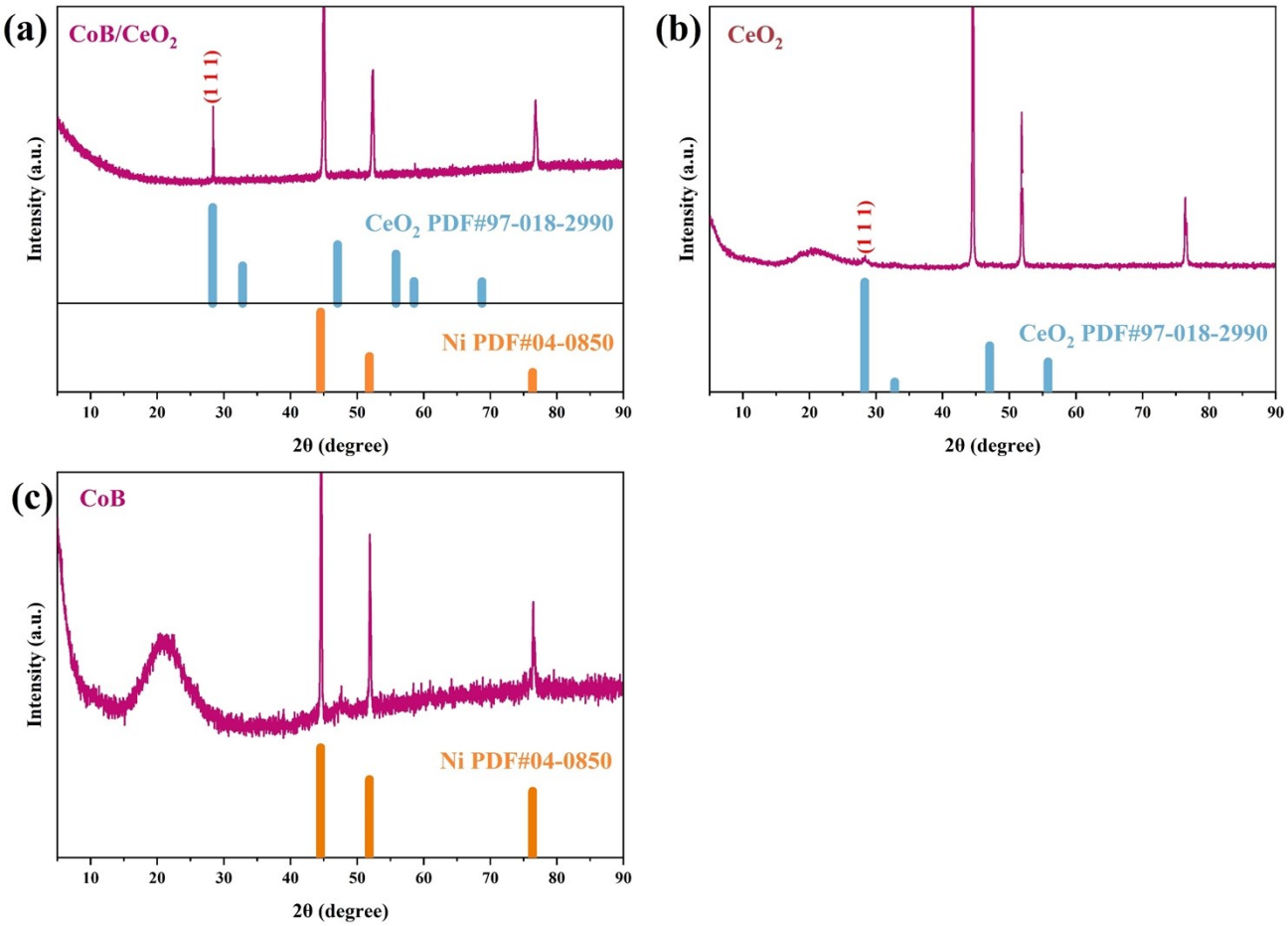

Figure S 5. XRD patterns of CoB/CeO_2, CeO_2, and CoB.

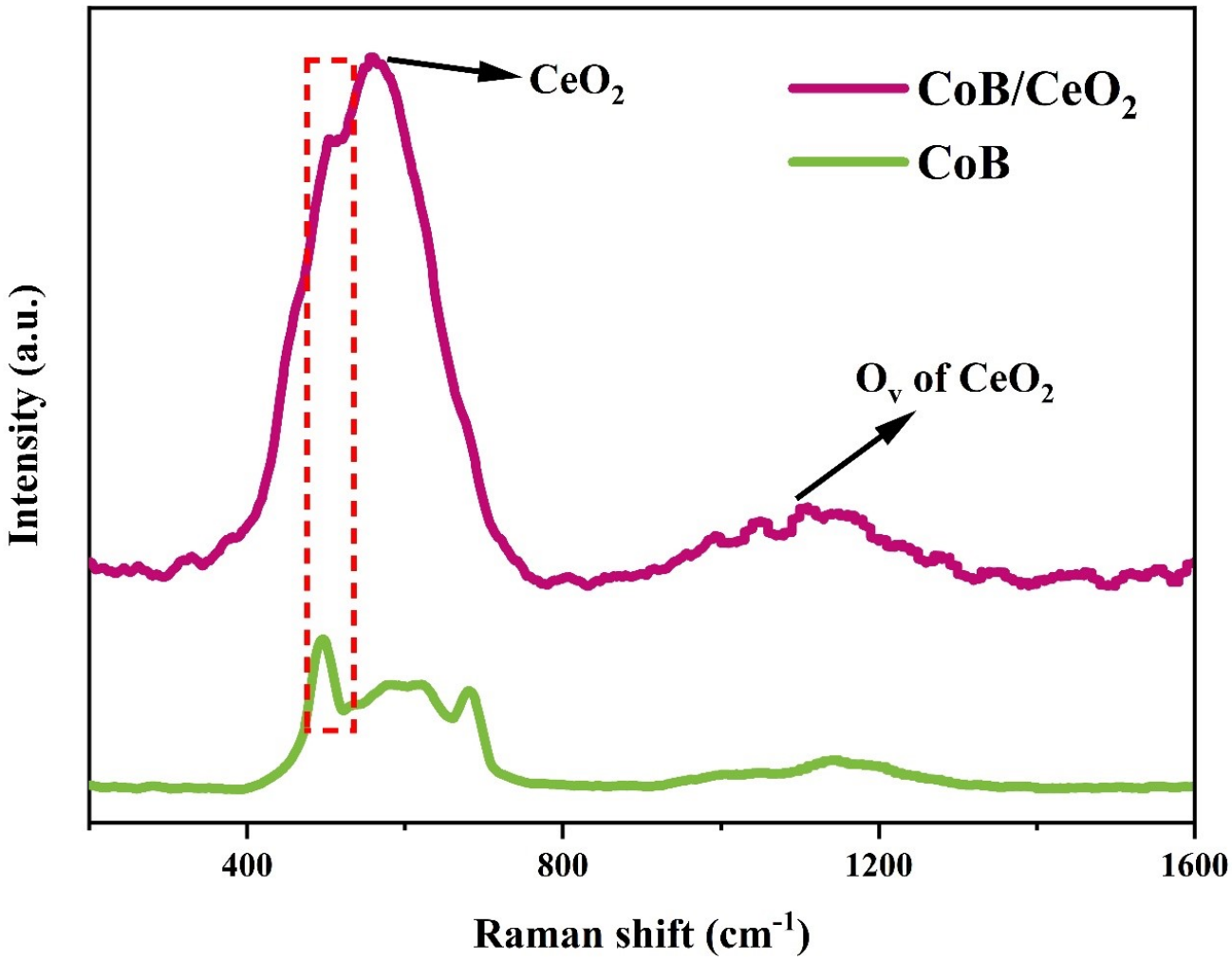

Figure S 6. Raman spectra of CoB and CoB/CeO_2.

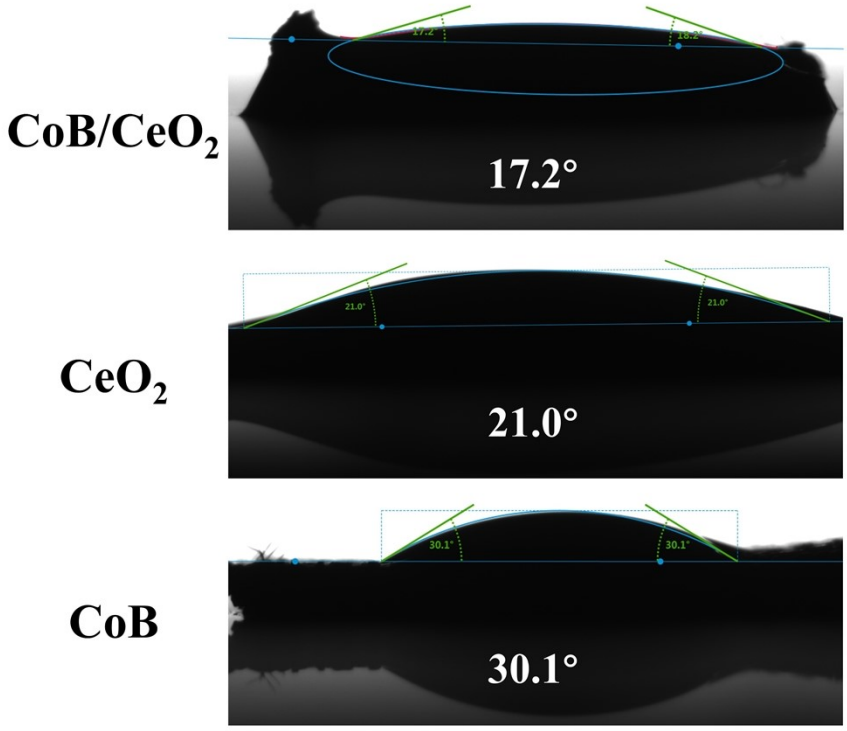

Figure S 7. The water contact angles of CoB/CeO_2, CeO_2, and CoB.

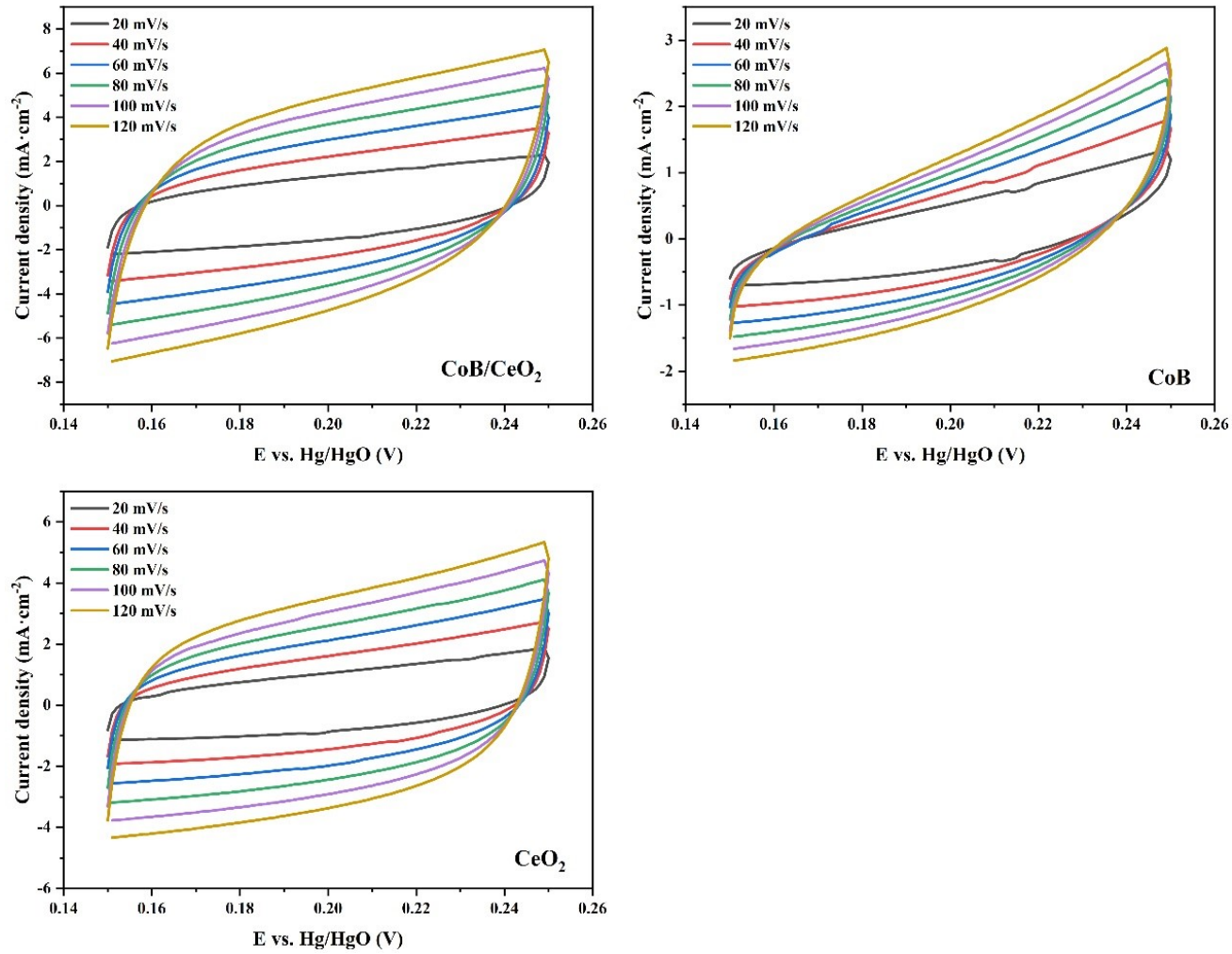

Figure S 8. CV curves of CoB/CeO_2, CoB, and CeO_2 in 1.0 M KOH.

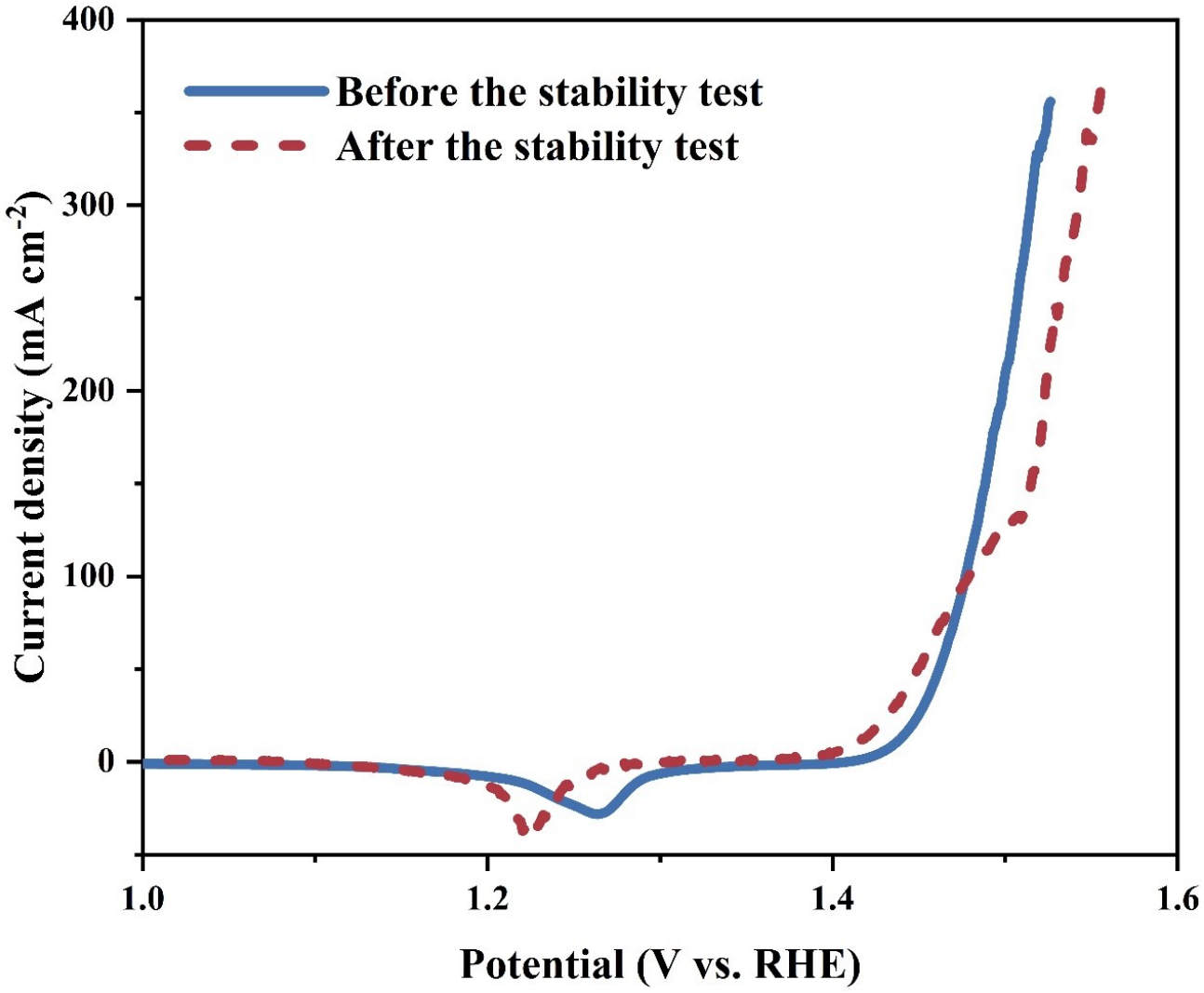

Figure S 9. LSV curves of CoB/CeO_2 in 1.0 M KOH before and after stability testing.

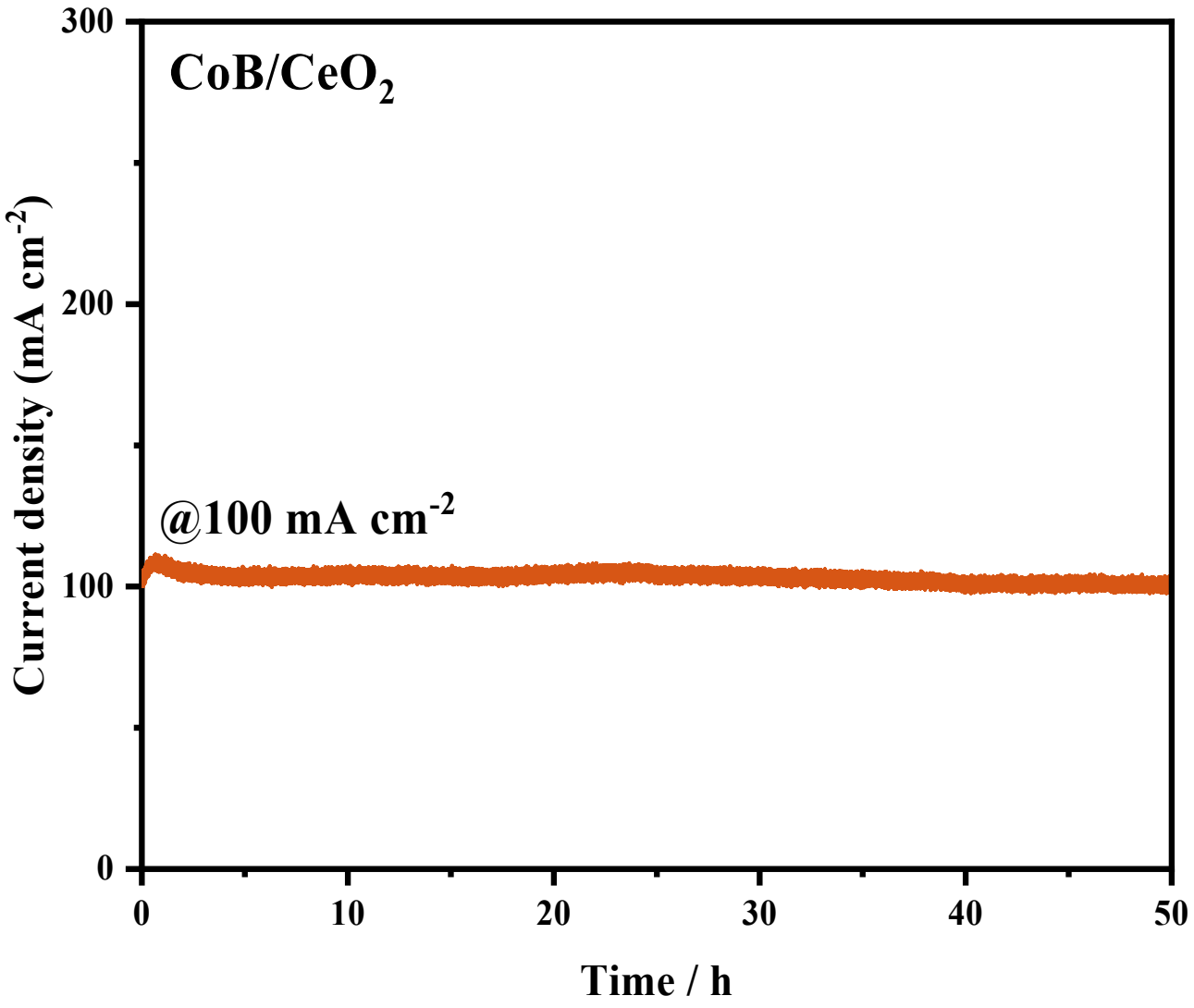

Figure S 10. I-T durability test of CoB/CeO_2 at 100 mA cm^{-2} for 50 hours.

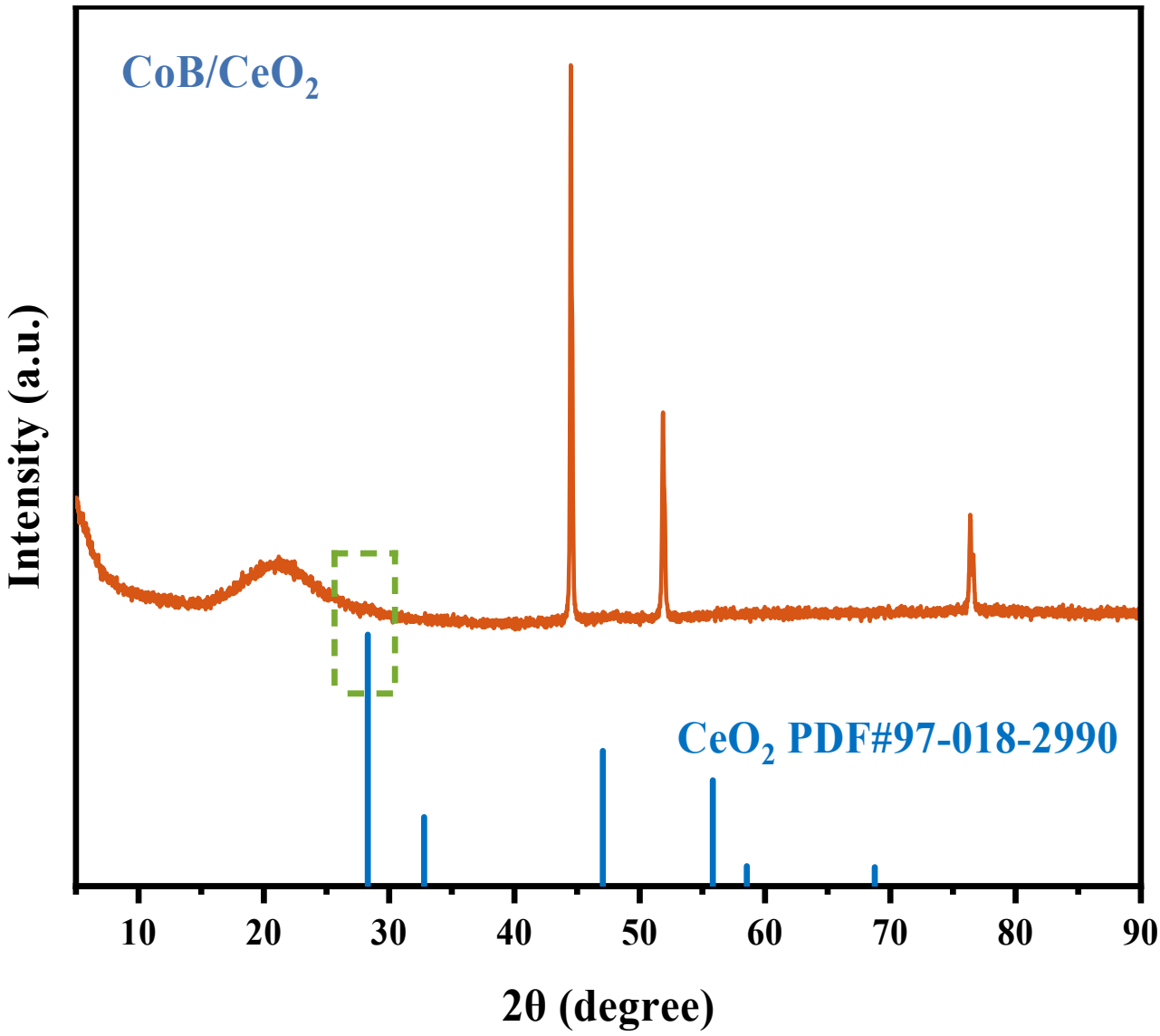

Figure S 11. XRD pattern of CoB/CeO_2 after 50 hours of stability testing in 1.0 M KOH.

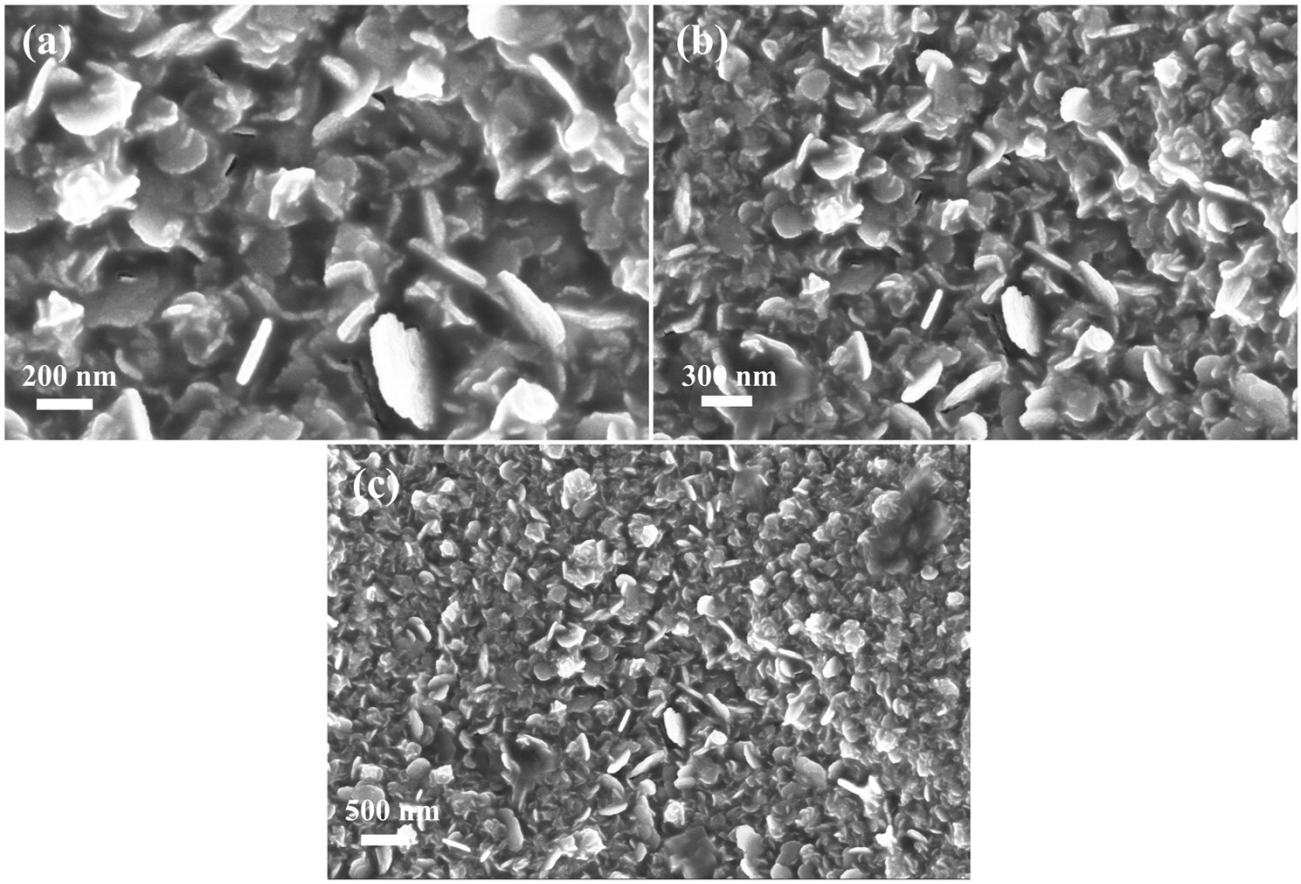

Figure S 12. SEM images of CoB/CeO_2 after 50 hours of stability testing in 1.0 M KOH at (a) 200 nm, (b) 300 nm, and (c) 500 nm.

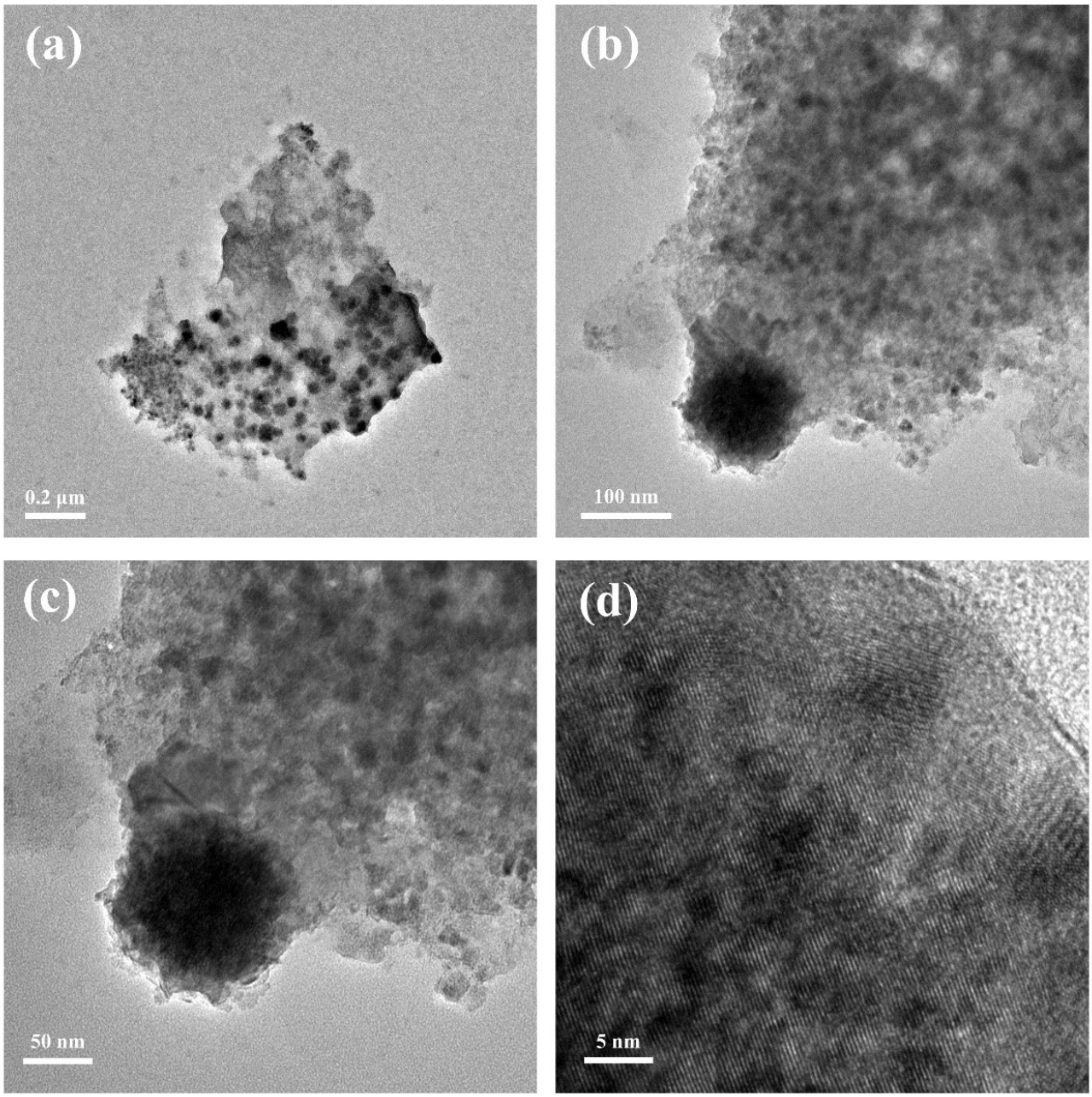

Figure S 13. After 50 hours of stability testing in 1.0 M KOH, TEM images of CoB/CeO_2 at (a) 0.2 µm, (b) 100 nm, and (c) 50 nm scales, and (d) HRTEM image at 5 nm scale.

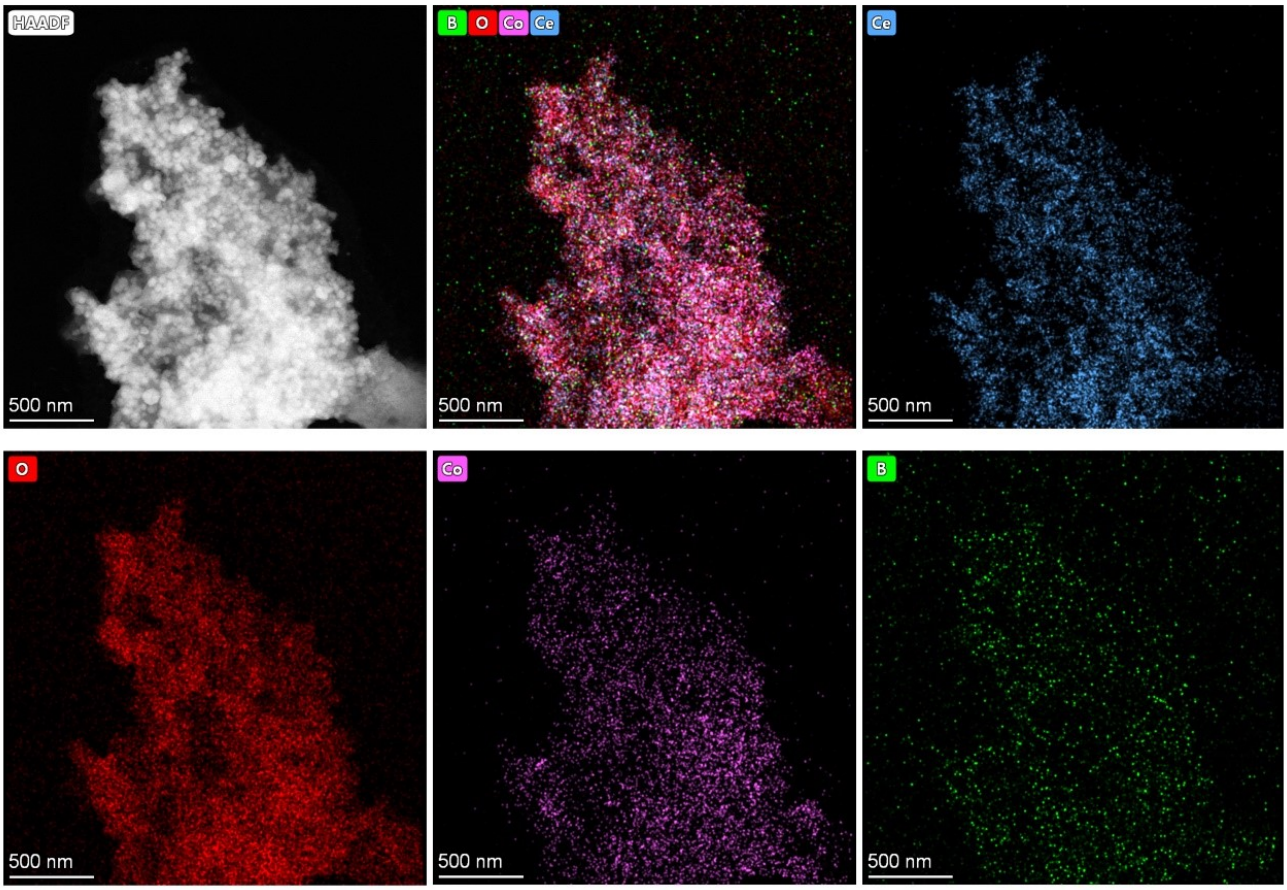

Figure S 14. Elemental mapping image of CoB/CeO_2 after 50 hours of stability testing in 1.0 M KOH.

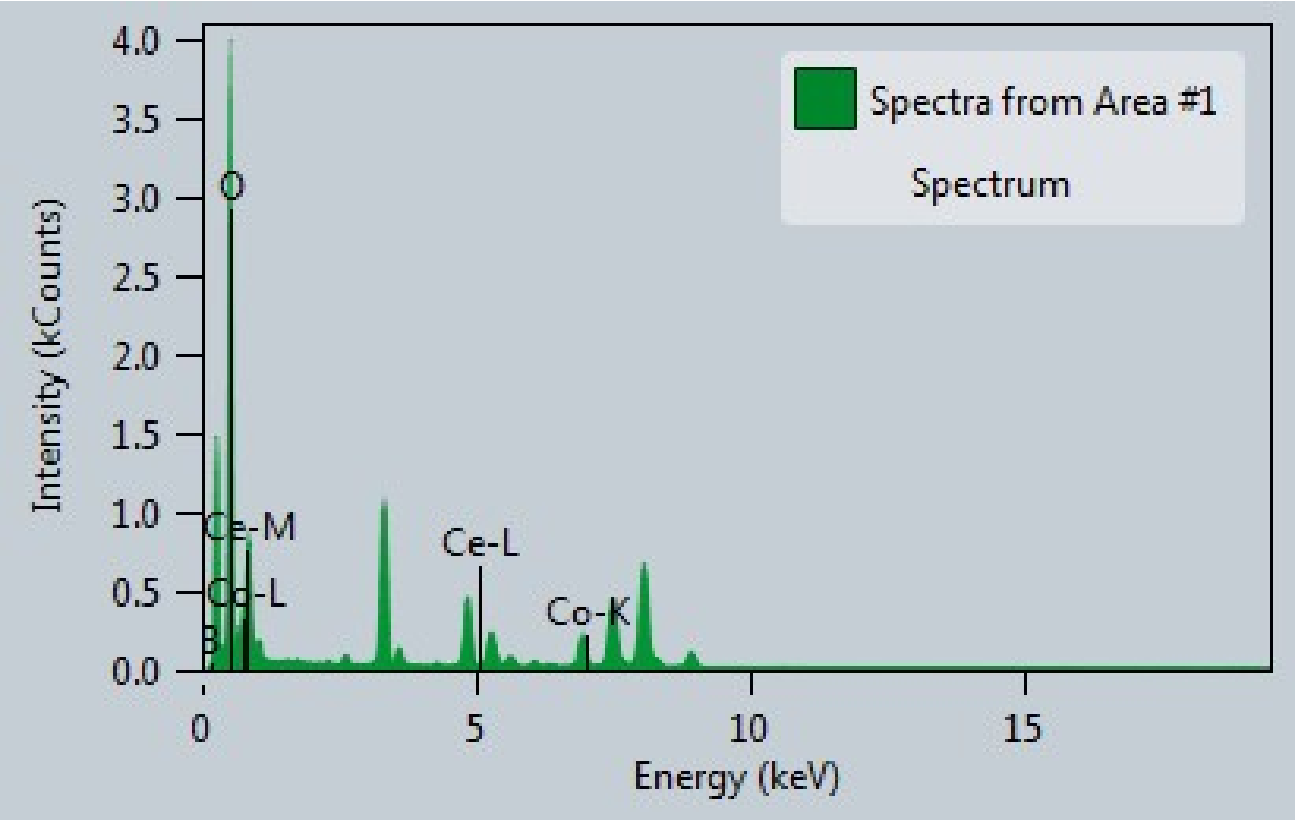

Figure S 15. EDX spectrum of CoB/CeO_2 after 50 hours of stability testing in 1.0 M KOH.

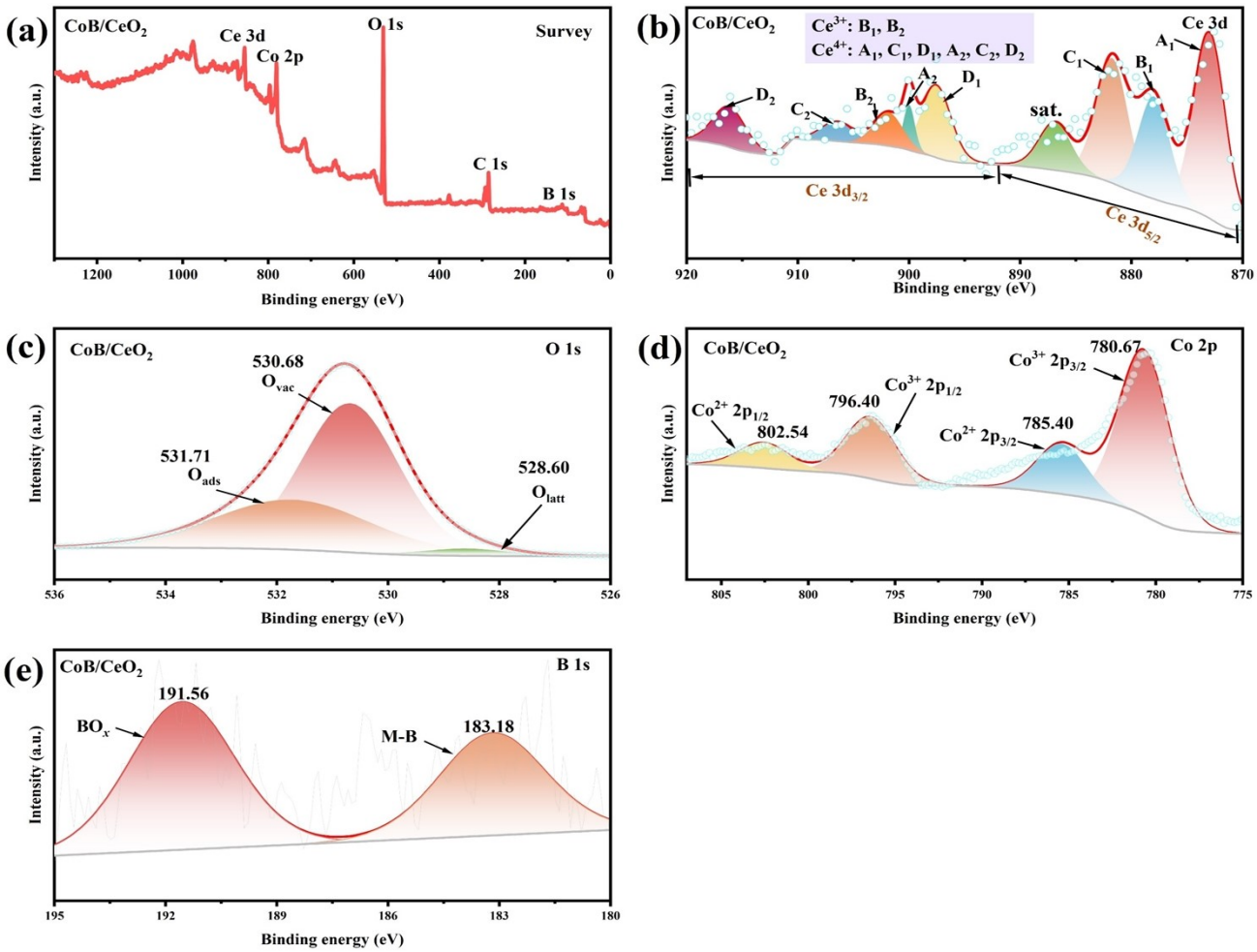

Figure S 16. XPS spectra of CoB/CeO_2 after 50 hours of stability testing in 1.0 M KOH: (a) Survey spectrum, (b) Ce 3d spectrum, (c) O 1s spectrum, (d) Co 2p spectrum, and (e) B 1s spectrum.

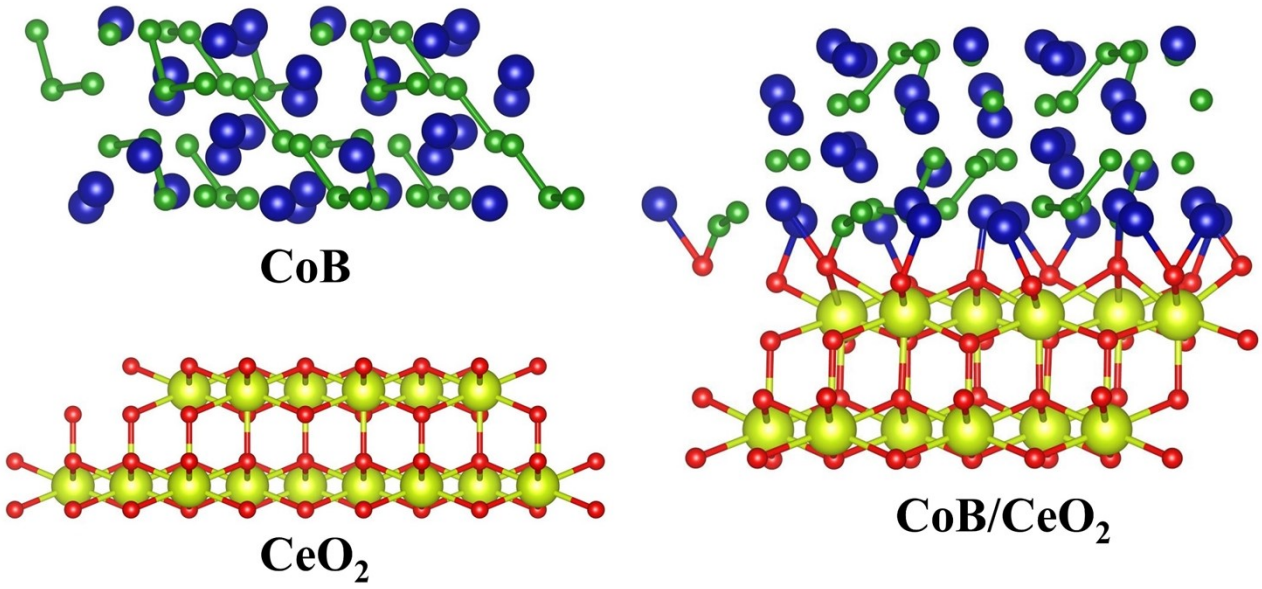

Figure S 17. Optimized atomic models of CoB, CeO_2, and CoB/CeO_2.

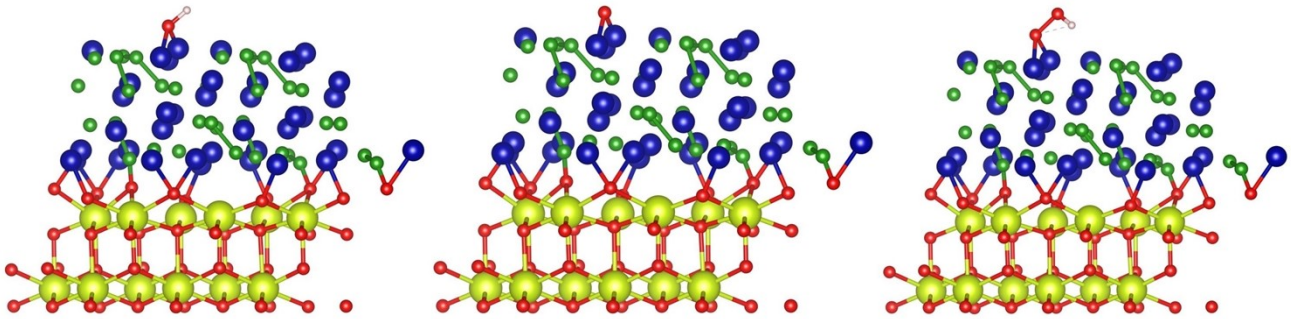

Figure S 18. The model of CoB/CeO_2 catalyst with oxygen vacancies after the adsorption of OH, O, and OOH.

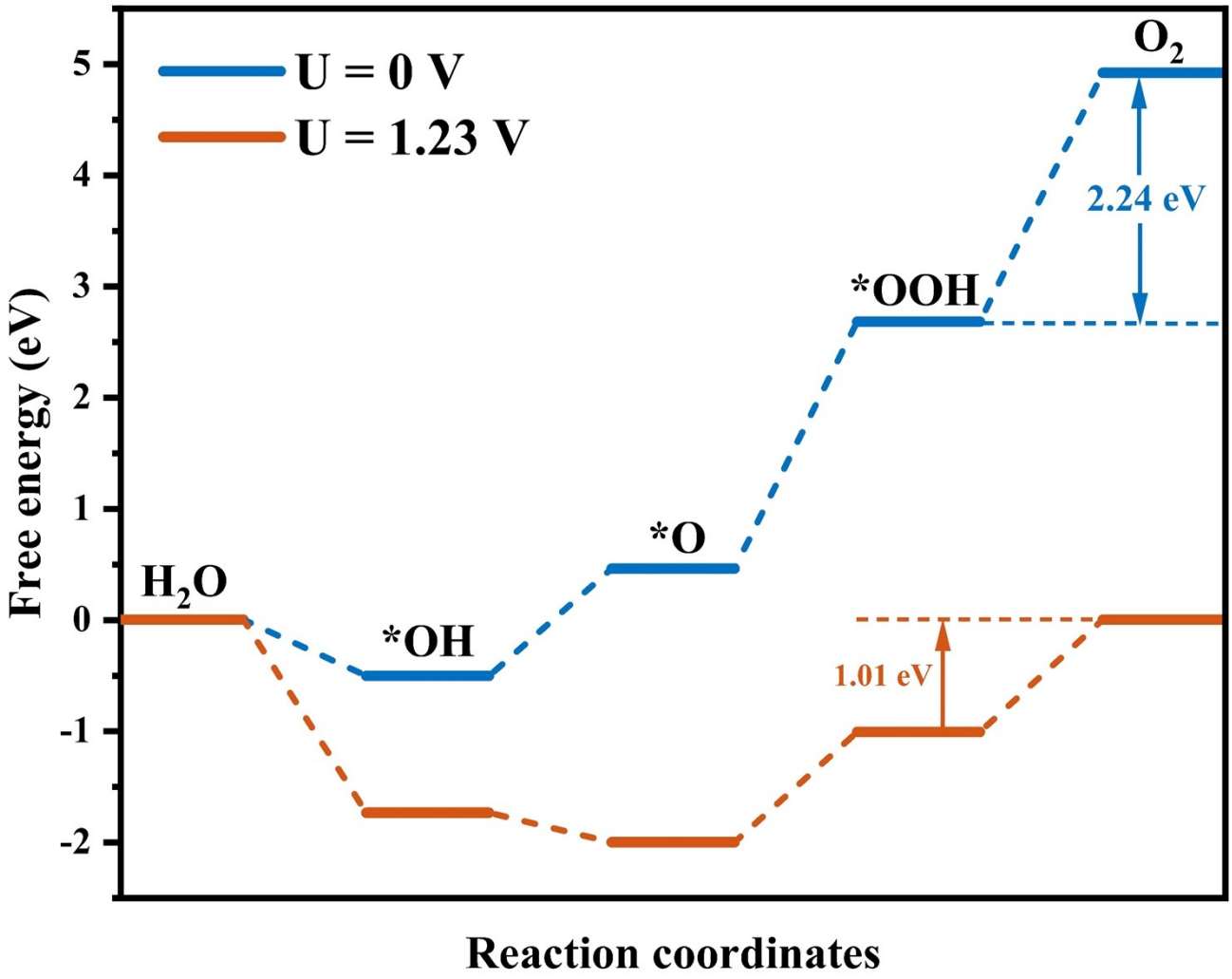

Figure S 19. The free energy distribution of oxygen vacancies on CoB/CeO_2 at U=0 V and U=1.23 V.

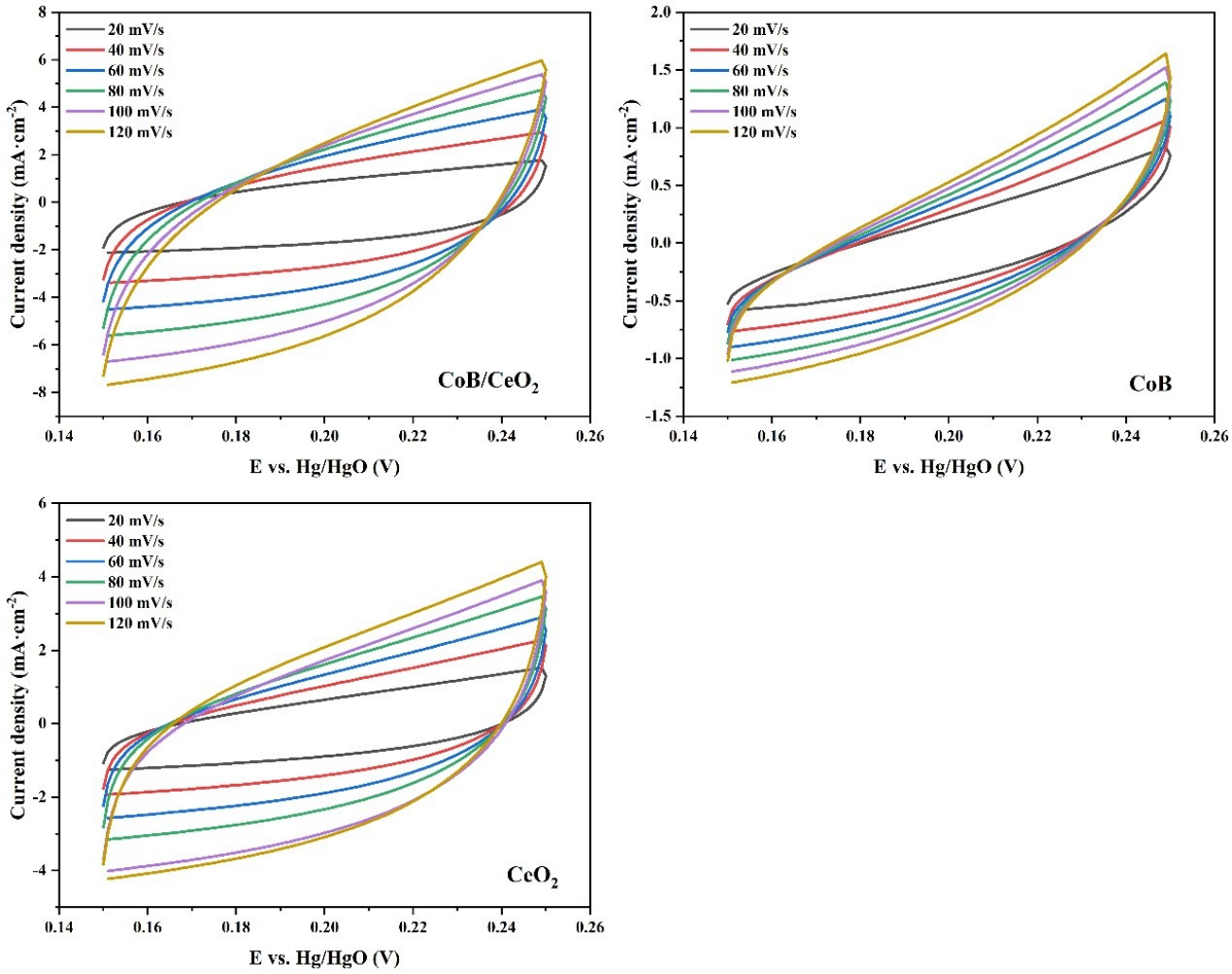

Figure S 20. CV curves of CoB/CeO_2, CoB, and CeO_2 in simulated seawater (1.0 M KOH + 0.5 M NaCl).

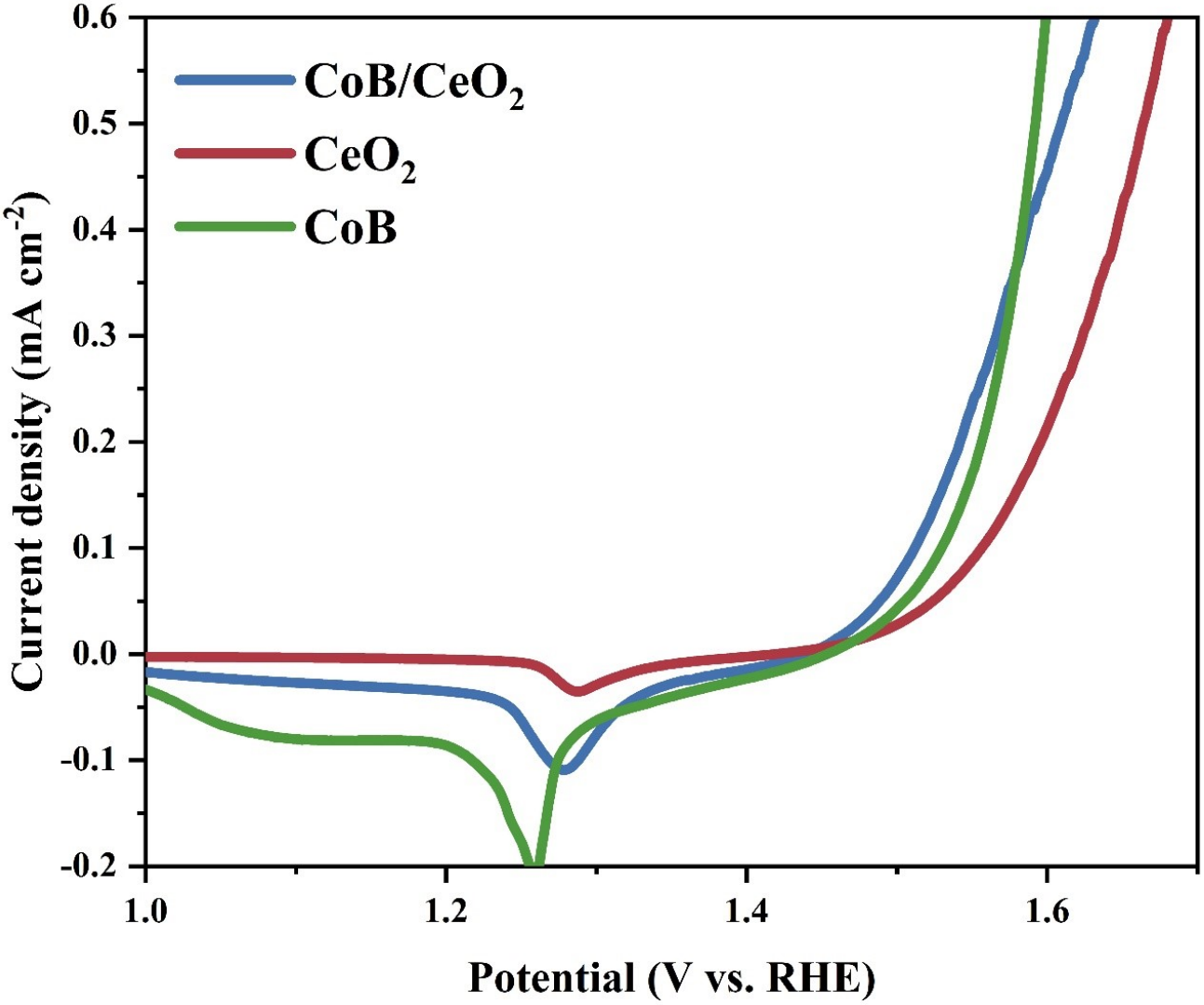

Figure S 21. Normalized LSV curves of CoB/CeO_2, CoB, and CeO_2 in simulated seawater (1.0 M KOH + 0.5 M NaCl).

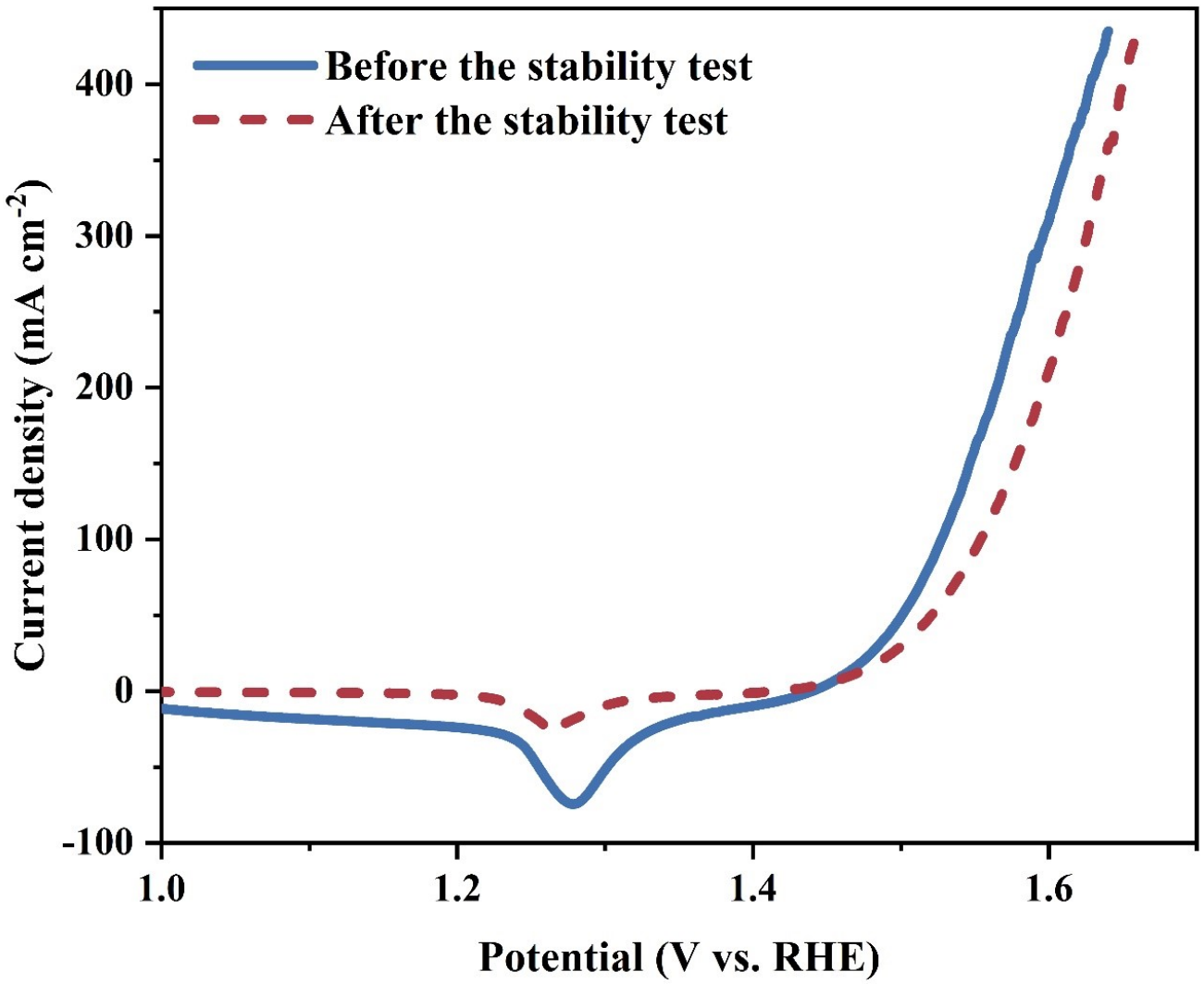

Figure S 22. LSV curves of CoB/CeO_2 in simulated seawater (1.0 M KOH + 0.5 M NaCl) before and after stability testing.

Table S 1. ECSA values of CoB/CeO_2,CeO_2 and CoB in 1.0 M KOH.

Catalysts	ECSA
CoB/CeO_2	840.50
CeO_2	615.75
CoB	171.50

Table S 2. Comparison of OER activity at 1.0 M KOH and 10 mA cm^{-2} current density.

Catalyst	At 10 mA cm^{-2}	Ref.
CoB/CeO_2	207	This work

Co_3S_4/CeO_2-CF	213	[1]
N-CoP/CeO_2	215	[2]
CeO_{2-x}/NiFe-LDH	216	[3]
CeO_2@Co_2N	219	[4]
V-CoP@a-CeO_2	225	[5]
Co_4N-CeO_2/GP	239	[6]
Fe_2P–CoP/CeO_2-20	248	[7]
Ce/N-NiO	250	[8]
CeO_2-Ni_3S_2/NF	251	[9]
CeO_2-$NiCoP_x$/NCF	260	[10]
NF/Co_4N@CeO_2	263	[11]
CeO_2-CuCoO/NF	266	[12]
$MnCo_2O_4/CeO_2$	276	[13]
Co-Fe-B	280	[14]
CeFeCe0.5	329	[15]

Table S 3. Comparison of OER activity at 1.0 M KOH and 100 mA cm^{-2} current density.

Catalyst	At 100 mA cm^{-2}	Ref.
CoB/CeO_2	247	This work
Co/CeO_2@CF	282	[16]
CoP/CeO_2–FeO_xH	285	[17]
Co_3O4–CeO_2@FNF	290	[18]
CeO_2-$Co(OH)_2$	299	[19]
Co_4N-CeO_2/GP	320	[6]
$CeO_2/CoS_{1.97}$	320	[20]
NF/Co_4N@CeO_2	325	[11]
CoO-CeO_2	340	[21]
V-CoP@a-CeO_2	340	[5]
$Co_{0.4}Ni_{1.6}P$-CeO_2	343	[22]
CeO_2@Co_2N	345	[4]
CeO_2/Co_3O_4	350	[23]
Co_3S_4/CeO_2-CF	355	[1]
CeO_2-Ni_3S_2/NF	364	[9]

3DOM-Co_3O_4/CeO_2	370	[24]
CeO_2-CuCoO/NF	490	[12]

Table S 4. ECSA values of CoB/CeO_2,CeO_2 and CoB in simulated seawater (1.0 M KOH + 0.5 M NaCl).

Catalysts	ECSA
CoB/CeO_2	681.25
CeO_2	457.75
CoB	83.00

Table S 5. Comparison of OER activity in simulated seawater (1.0 M KOH + 0.5 M NaCl) and 10 mA cm^{-2} current density.

Catalyst	At 10 mA cm^{-2}	Ref.
CoB/CeO_2	230	This work
CeOx@$NiCo_2O_4$/NF	240	[25]
Fe_2P/NiCoP	255	[26]
NF@NiBx−3h	261	[27]
Co_8FeS_8/ESM-900	271	[28]
CoNiWFeVOx	272	[29]
MoC-Mo_2C/CNTs	279	[30]
Ce-$NiSe_2$/CoP	304	[31]
Co-B	305	[32]
$NiCo_2O_4$/NiCoP	340	[33]
CSC-Fe	359	[34]
NiMoSe@CC	360	[35]
NiMn/Ti-1	386	[36]

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