Supplementary information

Harnessing lattice oxygens in a high-entropy perovskite oxide for enhanced oxygen evolution reaction

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Table S1 Refined lattice parameters and reliability factors of BSCTRS.

parameter	**value**
Space group	$Pm\bar{3}m$
a (Å)	3.9850 (1)
Sr/Ba–O (Å)	2.8178 (1)
Co/Ti/Ru/Sb–O (Å)	1.9925 (1)
R_{Bragg}	1.38
R_F	5.29
R_p	1.43
R_{wp}	1.97
χ^2	4.24

Table S2 Atomic sites, occupancies, positions, and thermal parameters of BSCTRS.

atom	**Wyckoff site**	***x***	***y***	***z***	**S.O.F.**	**B_{iso}**
Ba/Sr	1b	0.5	0.5	0.5	0.33/0.67	0.67
Co/Ti/Ru/Sb	1a	0	0	0	0.33/0.165/0.165/0.33	0.85
O	3d	0.5	0	0	1	0.97

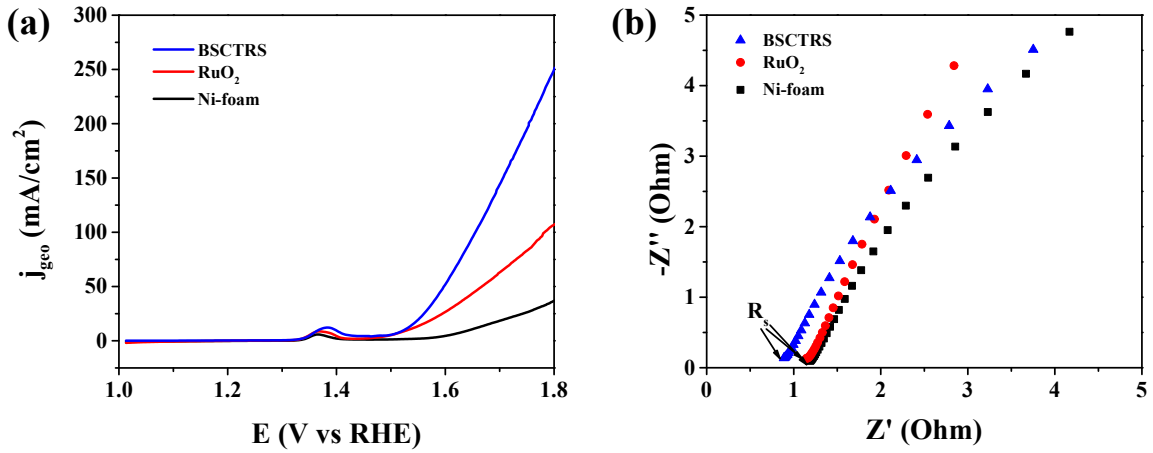

Fig. S1 (a) LSV curves without iR-correction. (b) EIS Nyquist plots.

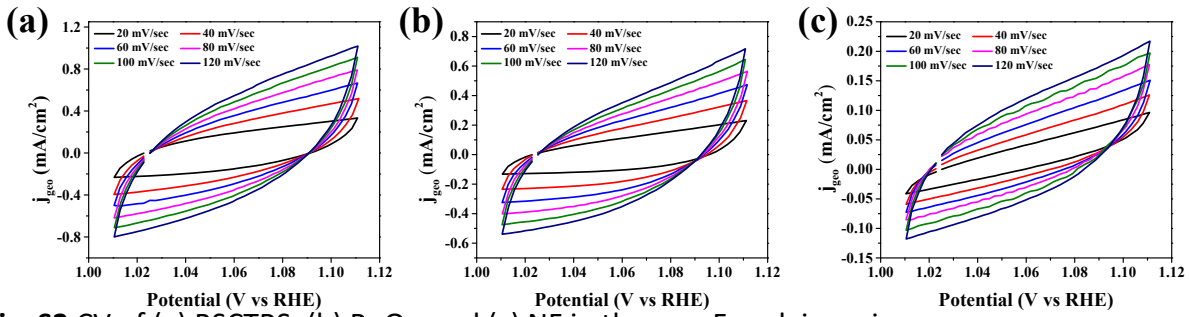

Fig. S2 CV of (a) BSCTRS, (b) RuO_2, and (c) NF in the non-Faradaic region.

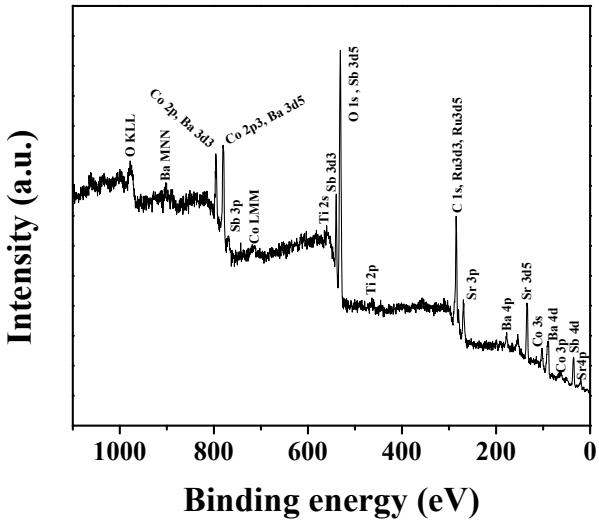

Fig. S3 XPS survey spectra of BSCTRS.

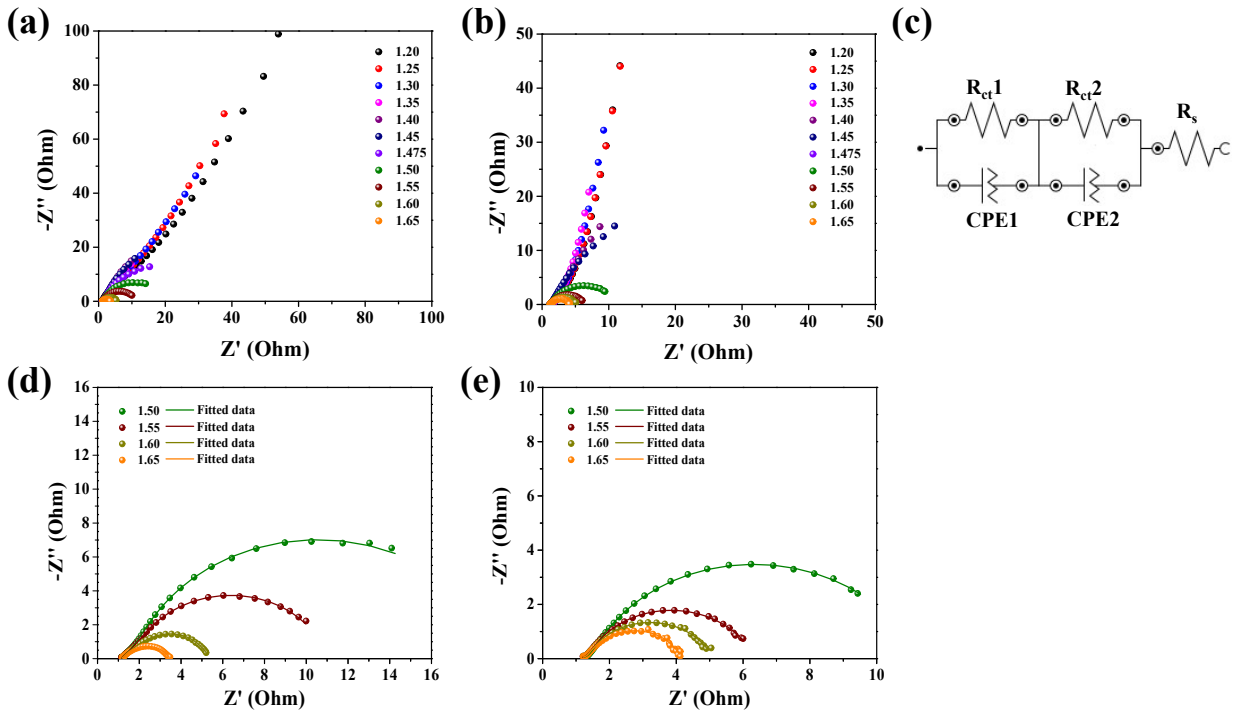

Fig. S4 EIS Nyquist plots of (a) BSCTRS and (b) RuO_2 at different potential ranging from 1.20 to 1.65 V vs RHE, (c) Equivalent circuit diagram. EIS Nyquist plot circuit fitting of (d) BSCTRS and (e) RuO_2 at potentials from 1.50 to 1.65 V vs RHE.

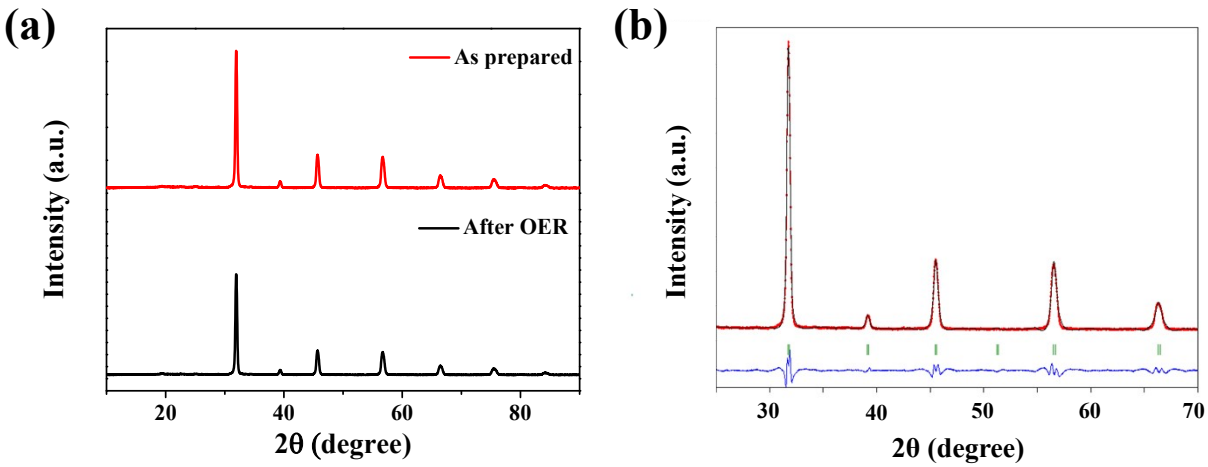

Fig. S5 (a) As synthesized and post-catalytic PXRD patterns of BSCTRS. (b) Refinement profile of post-catalytic PXRD pattern using Le Bail method.

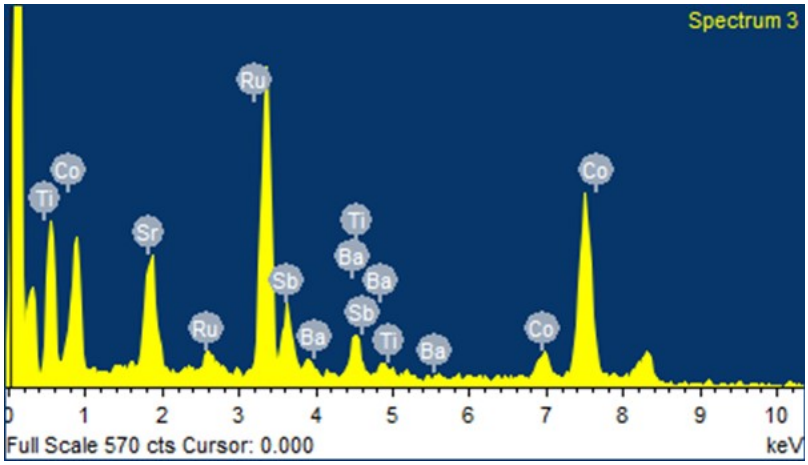

Fig. S6 Post-catalytic EDS of BSCTRS.

Table S3 MP-AES analysis of electrolyte after chronopotentiometry.

Elements	**concentration (mg/L)**	**percentage**
Ba	0.0137	0.03
Sr	0.0517	0.09
Co	0.0145	0.07
Ti	0.0016	0.02
Ru	0.0126	0.07
Sb	0.0165	0.04

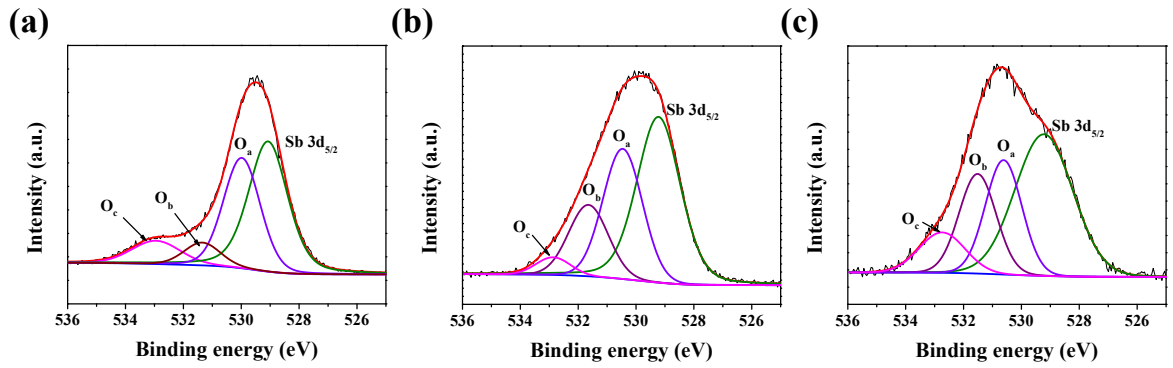

Fig. S7 O 1s XPS spectra of BSCTRS (a) after treating at 1 M KOH solution, (b) after 10 CV cycles to activate the catalyst and (b) after performing chronopotentiometry.

Table S4 Percentage of different oxygen species at different conditions from deconvoluted O1s XPS spectra.

percentage of oxygen species	**pristine**	**@ 1 M KOH**	**after 10 CV cycles**	**after chronopotentiometry**
O_a	56	60	60	43
O_b	37	17	33	38
O_c	7	23	7	19