Supporting information

For

Cerium substitution in $LaCoO_3$ Perovskite as bifunctional electrocatalysts for hydrogen and oxygen evolution reaction

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Table S1. The EDS results of La and Ce in as-prepared catalysts.

Samples	Atomic ratio	
	La (%)	Ce (%)
LCC	100	0
LCC2	91.4	8.6
LCC4	89.2	10.8
LCC6	88.7	11.3
LCC8	87.1	13.9
LCC10	85.3	14.7

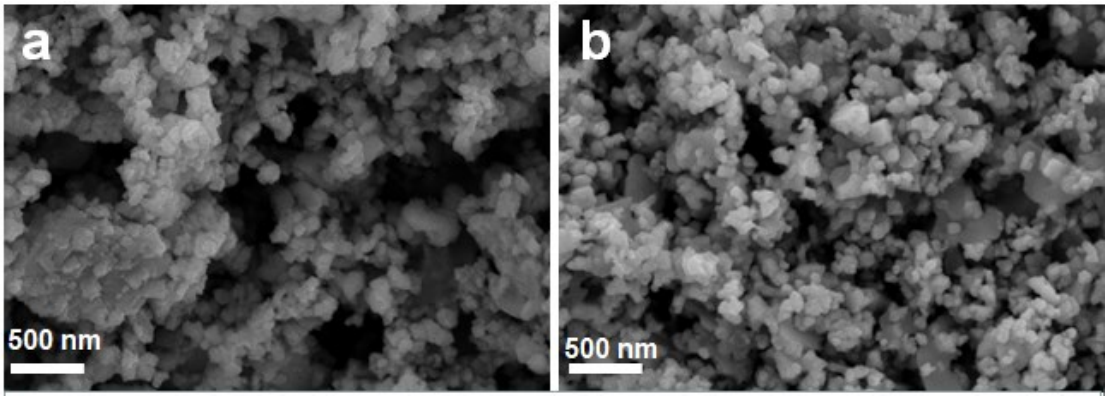

Figure S1 SEM images of pristine $LaCoO_3$ and LCC4 samples.

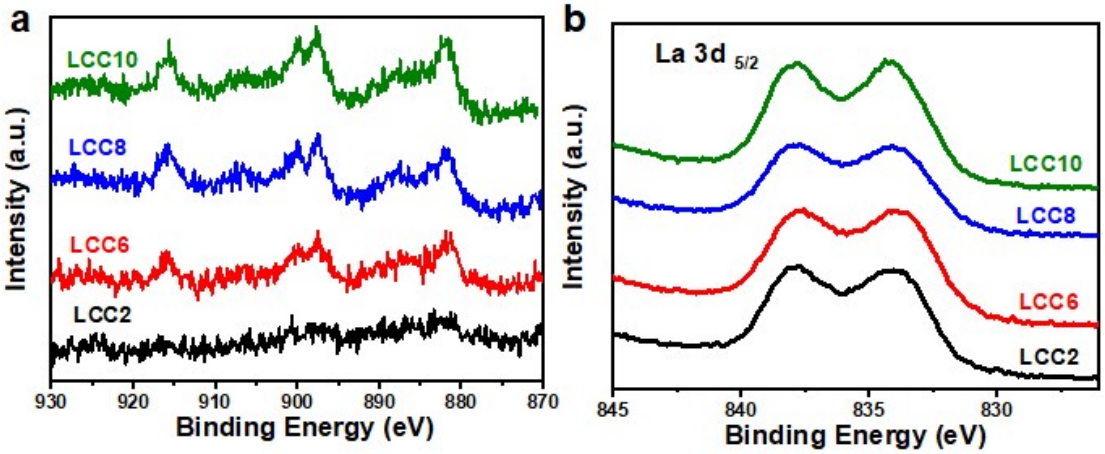

Figure S2 Ce 3d and La 3d5/2 XPS spectra of LCC2, LCC6, LCC8, and LCC10 samples.

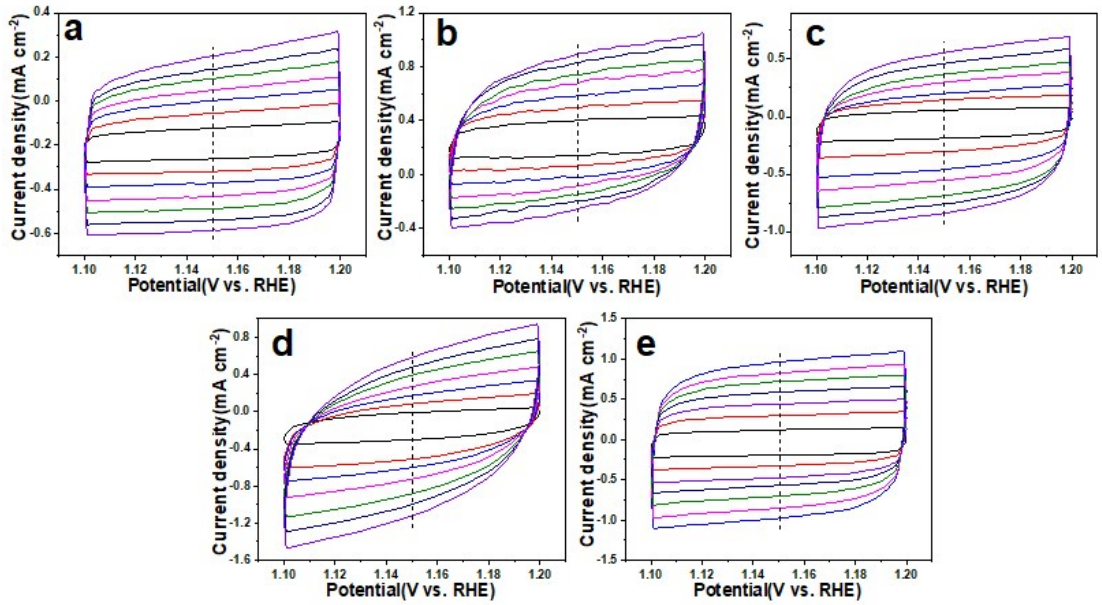

Figure S3 CV curves of (a) LCC, (b) LCC10, (c) LCC8, (d) LCC6, and (e) LCC2 for OER at under different scan rates from 20 to 140 mV s^{-1}.

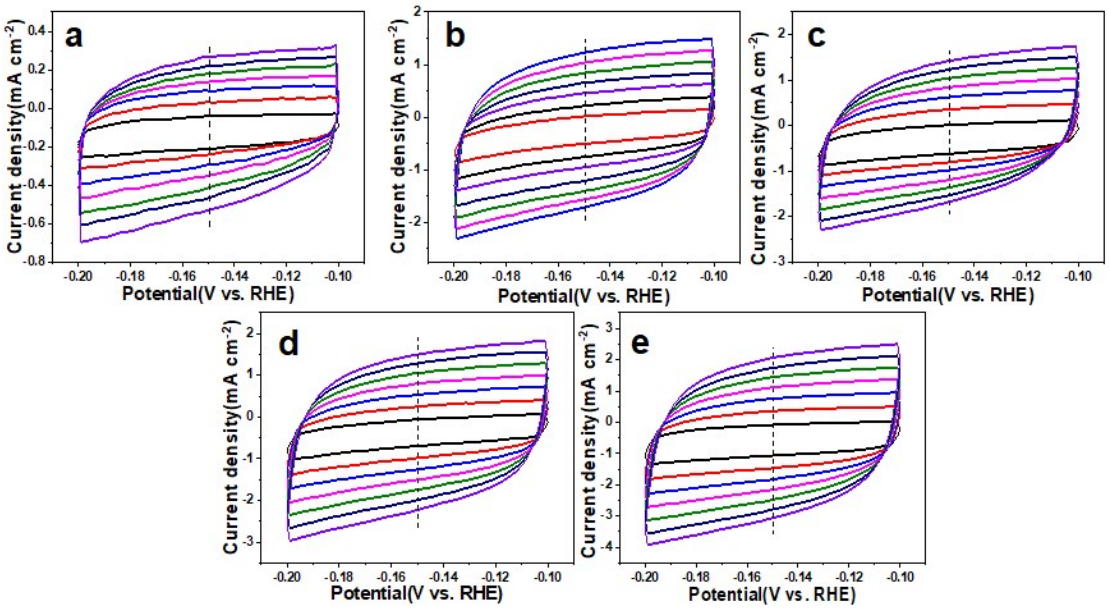

Figure S4 CV curves of (a) LCC, (b) LCC10, (c) LCC8, (d) LCC6, and (e) LCC2 for HER at under different scan rates from 20 to 140 mV s^{-1}.

Table S2 Comparison of electrocatalytic performance of perovskite oxide $LaCoO_3$ for both HER and OER

Catalysts	Overpotential (mV) at 10 mA cm^{-2}	HER/OER Tafel slope (mV/dec)	References
$La_xCe_{1-x}CoO_3$	338/410	144/80	*This work*
$LaCo_xNi_{1-x}O_3$	---/330	---/59	Ref.1
$La_xSr_{1-x}Co_yFe_{1-y}O_3$	---/360	---/77	Ref.2
$La_xSr_{1-x}CoO_3$	---/340	---/71	Ref.3
La_xCoO_3	---/380	---/83	Ref.4
$La_xCe_{1-x}CoO_3$	---/430	---/112	Ref.5
$LaCo_xPt_{1-x}O_3$	294/454	148/86	Ref.6
$CaSrFeMnO_{6-\delta}$	370/370	157/75	Ref.7
$Ca_3Co_4O_9$	320/410	91/61	Ref.8
$(Nd_{0.6}Sr_{0.4})_3((Co,Fe)_{0.85}Nb_{0.15})_2O_7$	470/420	133/89	Ref.9
$PrBa_{0.5}Sr_{0.5}Co_2O_5$	280/390	70/53	Ref.10
$NdBaMn_2O_{5.5}$	290/430	87/75	Ref.11
$SrNb_{0.1}Co_{0.7}Fe_{0.2}O_{3-\delta}$	260/390	134/61	Ref.12

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