Supporting Information

Enhancing bi-functional catalytic activity via a nanostructured $La(Sr)Fe(Co)O_{3-\delta}$ @Pd matrix as an efficient electrocatalyst for Li-O_2 batteries

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Table S1. ORR and OER activity of other perovskites

Sample	ORR			OER		Oxygen electrode ΔE (V) (E_{OER}-E_{ORR})	Reference
	Half-wave potential (V)	Limiting Current (mA/cm^2)	Tafel slope (mA/dec)	Potential (V) at 10mA/cm^2	Tafel slope (mA/dec)		
PBSC@Ni_3S_2 NFs	0.77	5.65	-	1.60	78	0.83	[1]
H_2-CMNO	0.66	5.9	80	1.78	98	1.12	[2]
LSCM-60	0.686	-	90	1.736	113	1.05	[3]
$LaMn_{0.7}Co_{0.3}O_3$	0.73	-	110	1.82	151	1.09	[4]
LSM60	0.714	-	96	1.817*	234	1.010*	[5]
LFP-5	0.66	6.41	-	1.69	-		[6]
SSC-HG	0.80		76	1.63	115	0.83	[7]
$LaNi_{0.85}Mg_{0.15}O_3$	0.69	-	105	1.68	95	0.99	[8]
Ag/LMO-NR/RGO	0.6906	5.08	-	-	-	1.06	[9]
Nano-LSCF@Pd	0.780	5.417	81	1.716	146	0.936	This Work

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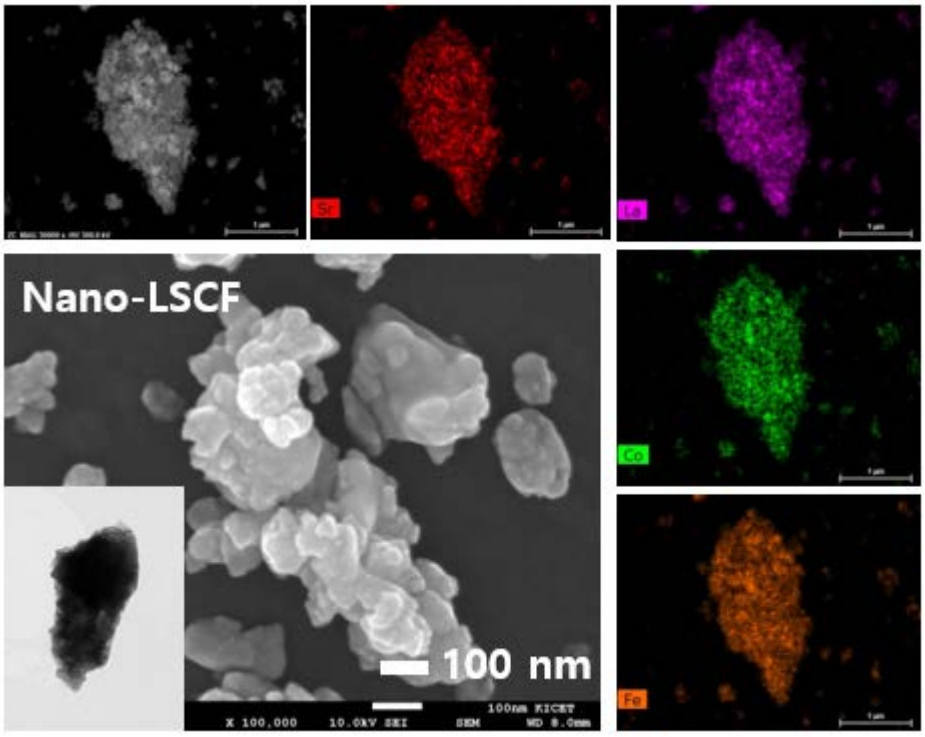

Figure S1. FE-SEM and TEM images of Nano-LSCF and FE-SEM corresponding elements (La, Sr, Fe, Co) mapping images of Nano-LSCF

$$\boldsymbol{i_k = \frac{i_L \times i_m}{i_L - i_m}}$$

$\boldsymbol{i_k}$ **: kinetic current**
$\boldsymbol{i_L}$ **: Limit current**
$\boldsymbol{i_m}$**: current potential for ORR**

Specific Activity = i_k/Surface area of working Electrode

Mass catalytic Activity = i_k/ mass of catalyst

Intrinsic catalytic Activity = i_k/ surface area of catalyst

Figure S2. Equation of **s**pecific, mass and intrinsic catalytic activity.

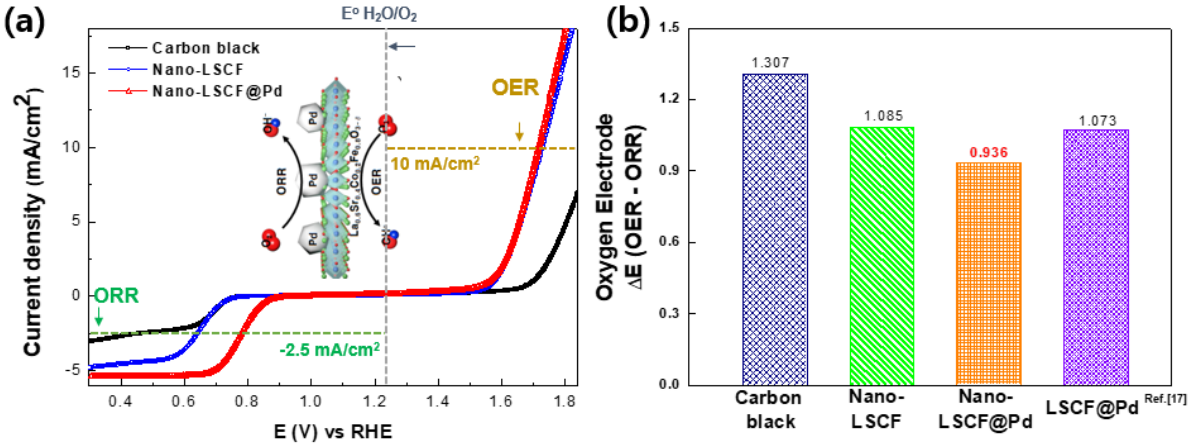

Figure S3. (a) Overall LSV curves: potential difference (ΔE) between the ORR and the OER, (b) corresponding ΔE values, from the potential at 2.5 mA cm^{-2} which approximates the half-wave potential for the ORR and at 10 mA cm^{-2} which required to oxidize water for the OER.