

**The modulated oxygen evolution reaction performance of LaFeO₃
with abundant electronic structures via a design of stoichiometry
offset**

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Results and discussion

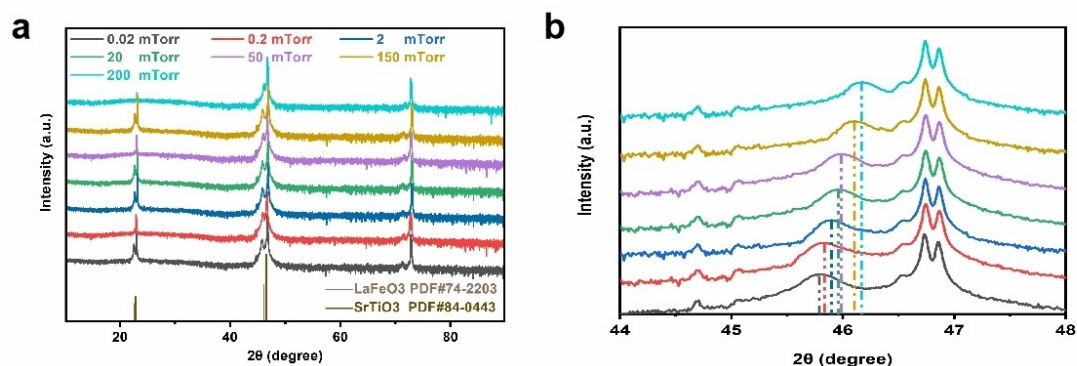


Fig. S1. The XRD of all samples fabricated under different oxygen atmospheres.

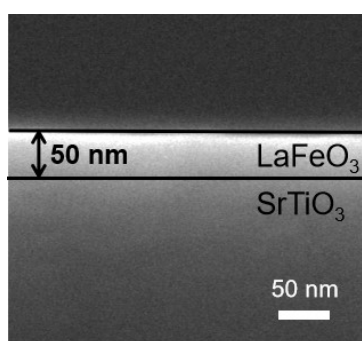
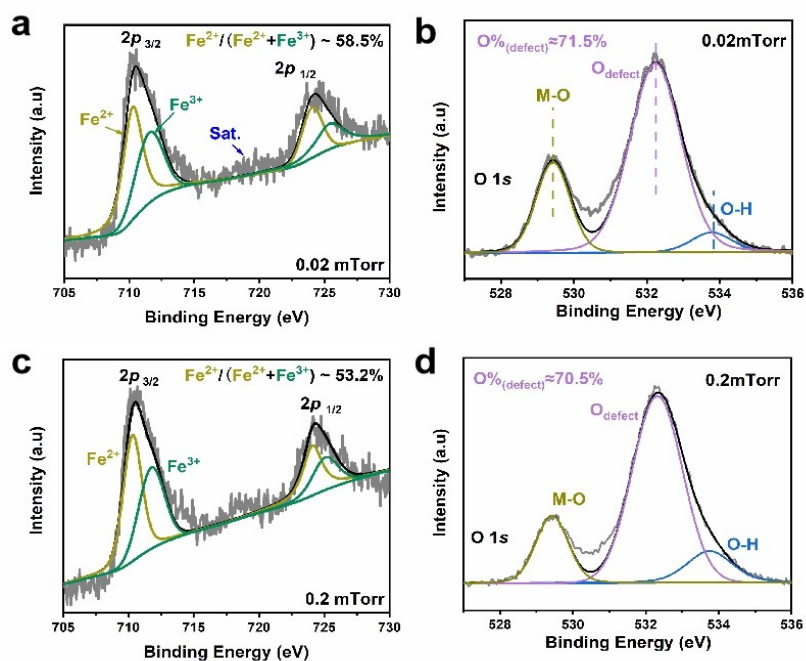


Fig. S2. SEM scanning image of LFO



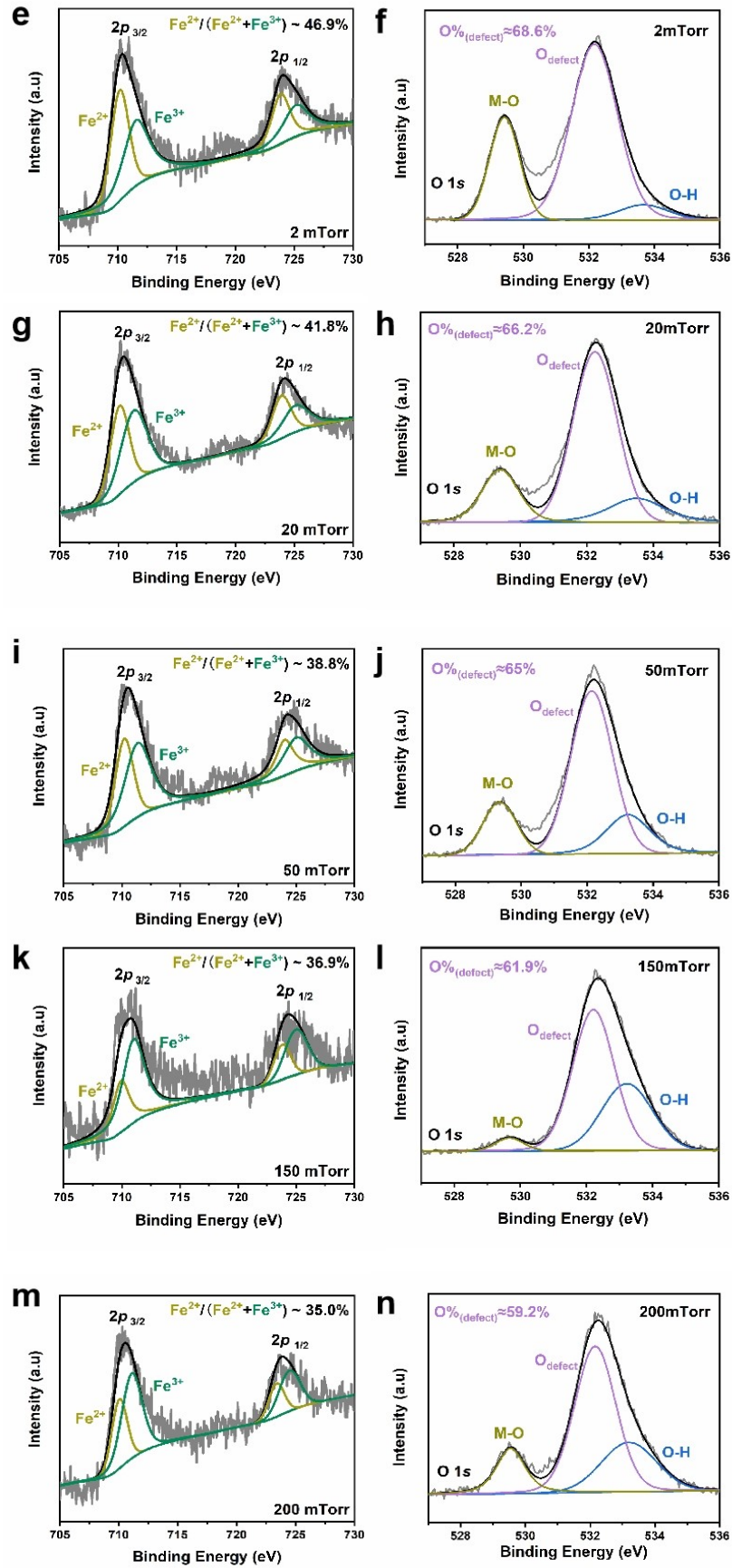


Fig. S3. The high-res Fe and O scans

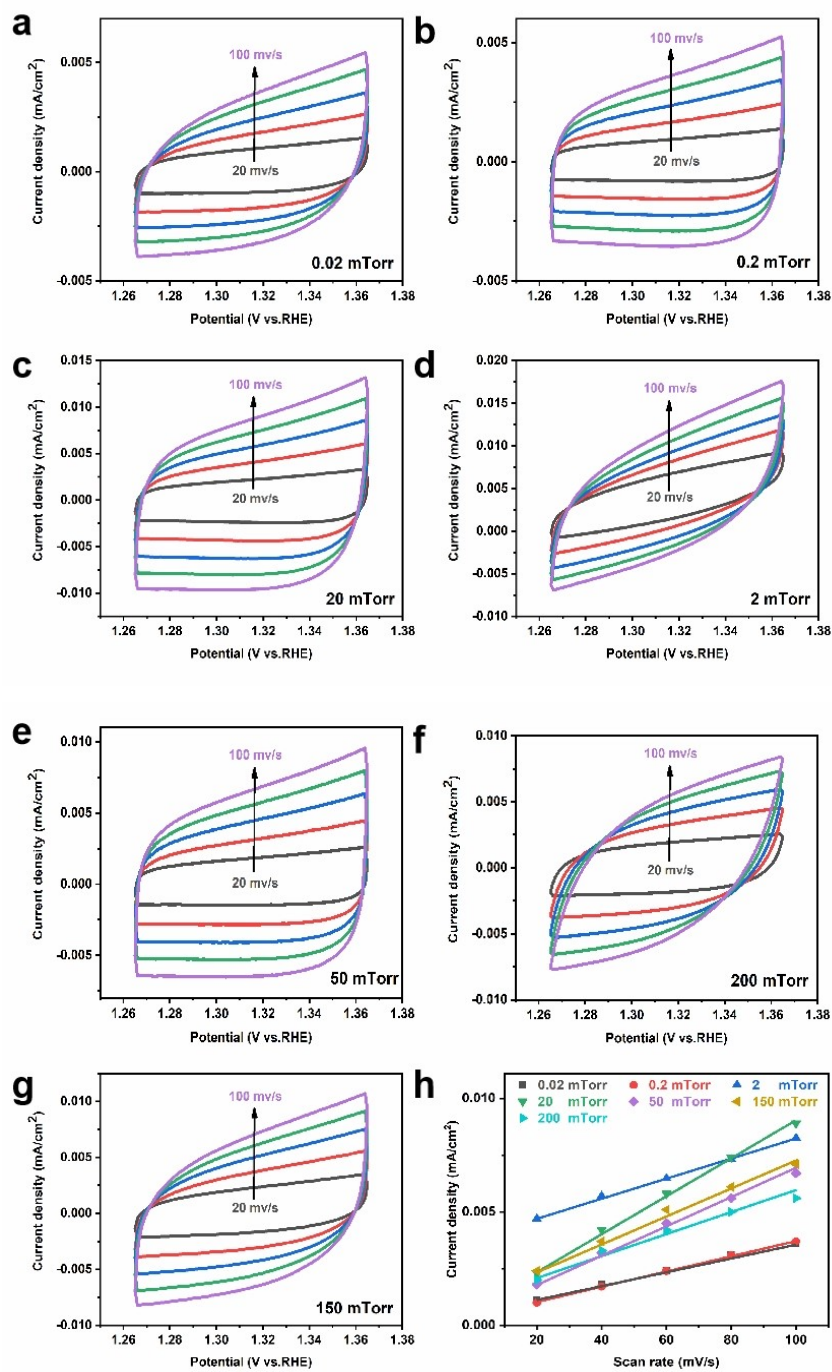


Fig. S4. The CVs for all samples and their double layer charging capacitance

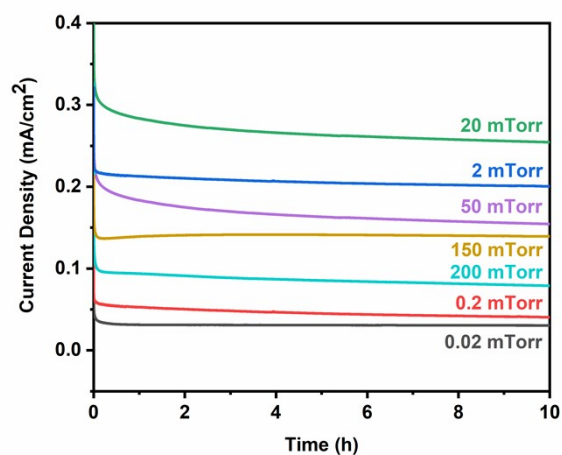


Fig. S5. Chronoamperometric response of LFO films under different oxygen pressures at the potential of 0.8 V vs. RHE

	$2p_{3/2}$						$2p_{1/2}$					
	Fe^{2+}			Fe^{3+}			Fe^{2+}			Fe^{3+}		
	peak position	full-width at half-maximum	intensity of fitted peaks	peak position	full-width at half-maximum	intensity of fitted peaks	peak position	full-width at half-maximum	intensity of fitted peaks	peak position	full-width at half-maximum	intensity of fitted peaks
0.02	710.26	1.8	13844.2	711.54	2.5	13206.0	724.05	1.8	13789.6	725.4	2.5	13454.2
0.2	710.3	1.7	12496.9	711.75	2.3	11790.3	724.1	1.7	12207.8	725.08	2.3	11950.9
2	710.17	1.85	10914.9	711.55	2.65	10198.1	723.85	1.85	10773.4	725.15	2.65	10582.3
20	710.1	1.9	19741.4	711.3	2.65	19488.0	723.9	1.9	20096.1	725.1	2.65	19792.0
50	710.2	1.85	8572.91	711.35	2.7	8474.39	724.0	1.85	8548.27	725.0	2.7	8597.53
150	709.93	1.7	1659.62	711.01	2.3	1881.75	723.8	1.7	1854.82	725.0	2.3	1942.32
200	710.05	1.55	7159.84	711.1	2.05	7179.8	723.4	1.55	7020.42	724.5	2.05	7259.43

Table S1. The Table of fitting parameters of Fe

	M-O			O _{defect}			O-H		
	peak position	full-width at half-maximum	intensity of fitted peaks	peak position	full-width at half-maximum	intensity of fitted peaks	peak position	full-width at half-maximum	intensity of fitted peaks
0.02	529.43	1.1	22080.3	532.24	1.65	36156.3	533.78	1.32	11667.9
0.2	529.43	1.05	20698.2	532.32	1.62	40847.7	533.75	1.46	14941.2
2	529.43	1.08	30763.7	532.17	1.66	45628.5	533.67	1.75	12925.9
20	529.4	1.3	17652.9	532.25	1.56	38021.8	533.5	1.98	12772.8
50	529.35	1.2	19375.7	532.14	1.5	39453.3	533.24	1.56	17068.0
150	529.67	1	9239.1	532.21	1.48	28075.4	533.22	1.8	16953.4
200	529.55	1.04	7145.2	532.16	1.5	14201.1	533.2	2	7485.2

Table S2. The Table of fitting parameters of O

Oxygen pressure	0.02 mTorr	0.2 mTorr	2 mTorr	20 mTorr	50 mTorr	150 mTorr	200 mTorr
Fe ²⁺	58.5%	53.2%	46.9%	41.8%	38.8%	36.9%	35.0%
O _{defect}	71.5%	70.5%	68.6%	66.2%	65.0%	61.9%	59.2%

Table S3. The stoichiometric ratios of Fe²⁺ and O_{defect}

Oxygen pressure	0.02 mTorr	0.2 mTorr	2 mTorr	20 mTorr	50 mTorr	150 mTorr	200 mTorr
capacitance (μF)	4.5	5.1	7.7	8.2	6.4	6.1	5.9

Table S4. The capacitance values of all samples