

Supporting information

Ti-doped SrFeO₃ nanostructured electrodes for Symmetric Solid Oxide Fuel Cells

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Figure S1. XRD patterns of $\text{Sr}_{0.98}\text{FeO}_{3-\delta}$ films prepared by spray-pyrolysis and different precursor solutions.

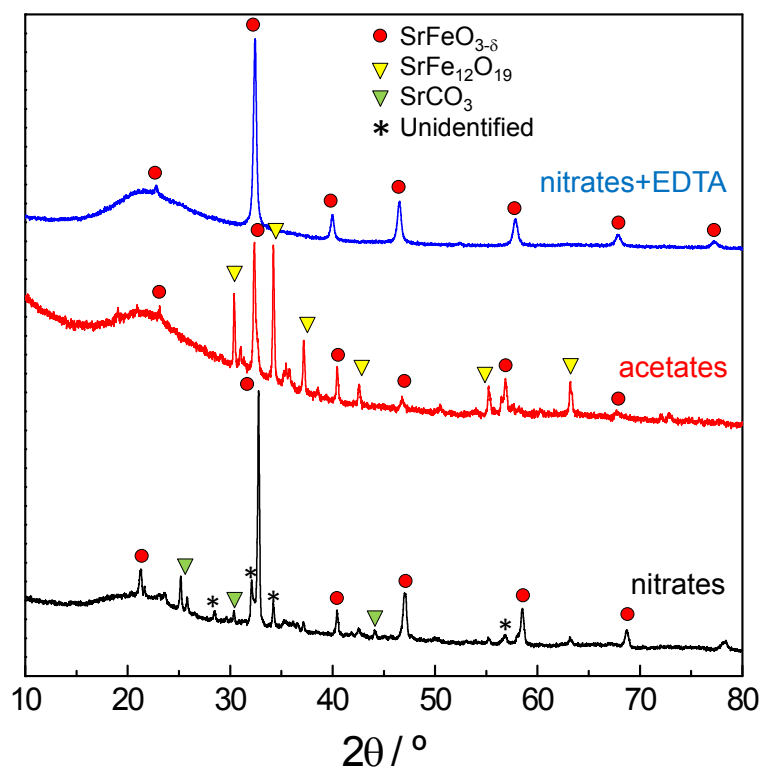


Figure S2. Unit cell volume for $\text{SrFe}_{1-x}\text{Ti}_x\text{O}_{3-\delta}$ series prepared in form of films by spray-pyrolysis (SP) at 650 °C and powder by freeze-drying precursors (FD) at 1100 °C.

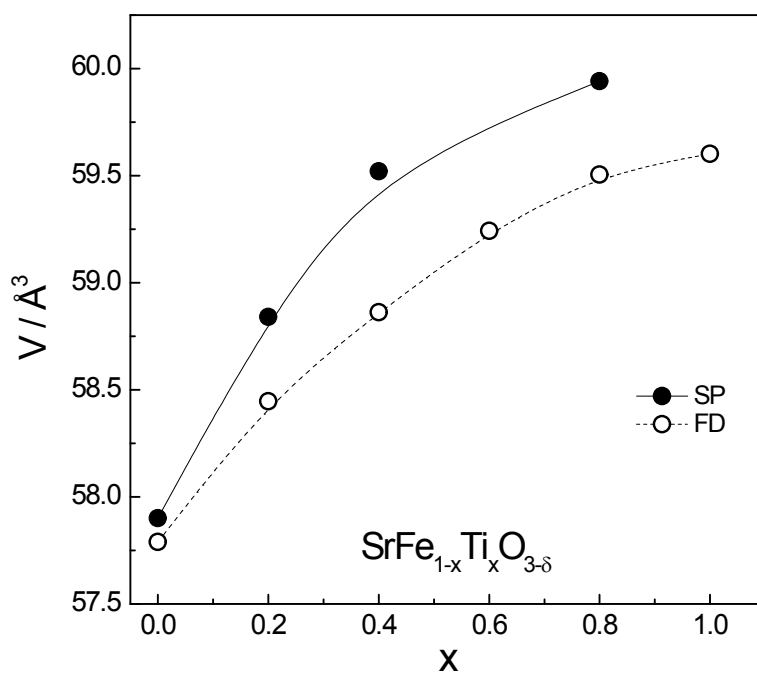


Figure S3. Rietveld plot of $\text{Sr}_{0.98}\text{Fe}_{0.8}\text{Ti}_{0.2}\text{O}_{3-\delta}$ deposited by spray-pyrolysis on CGO backbone after thermal treatment in air at 800 °C for 2 h.

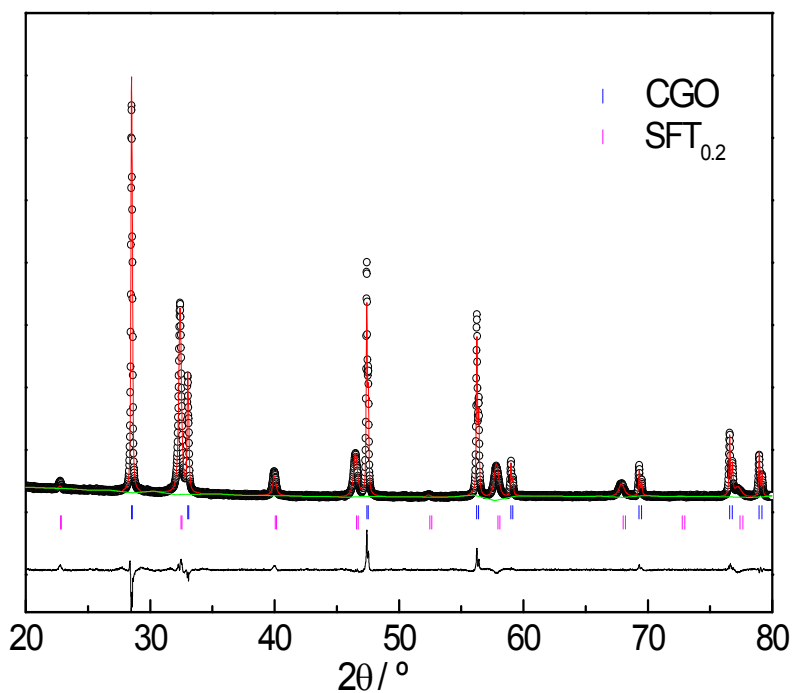


Figure S4. XRD patterns of $\text{Sr}_{0.98}\text{Fe}_{0.8}\text{Ti}_{0.2}\text{O}_{3-\delta}$ deposited by spray-pyrolysis on CGO backbone after annealing in air and humidified 5% H_2 -Ar at 750°C for 12 h.

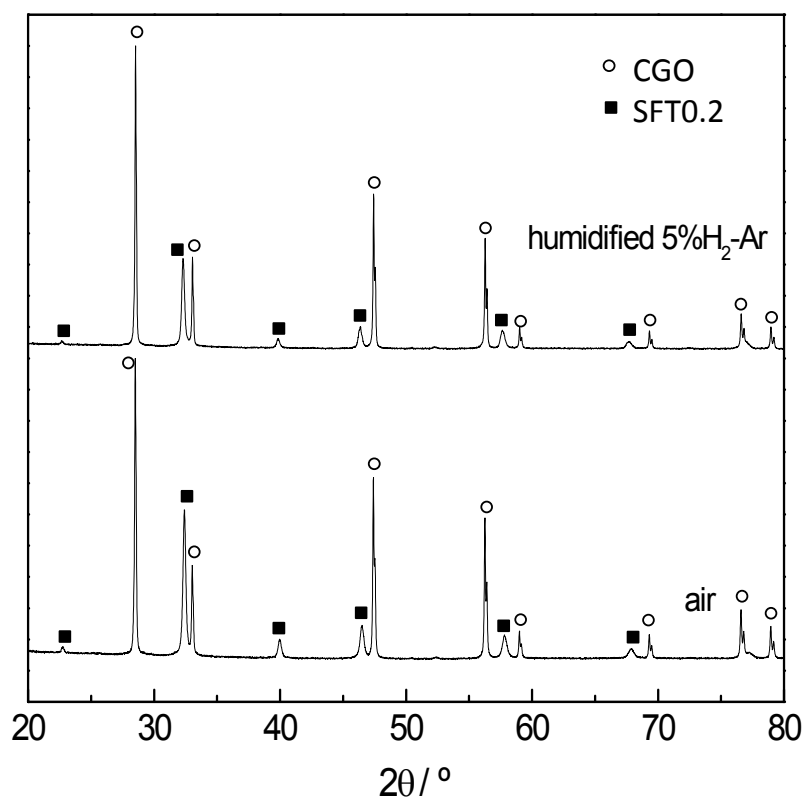


Figure S5. SEM micrograph of $\text{SrFe}_{0.8}\text{Ti}_{0.2}\text{O}_{3-\delta}$ -CGO electrodes prepared by freeze-drying precursor and deposited by screen-printing at 1100 °C for 1 h.

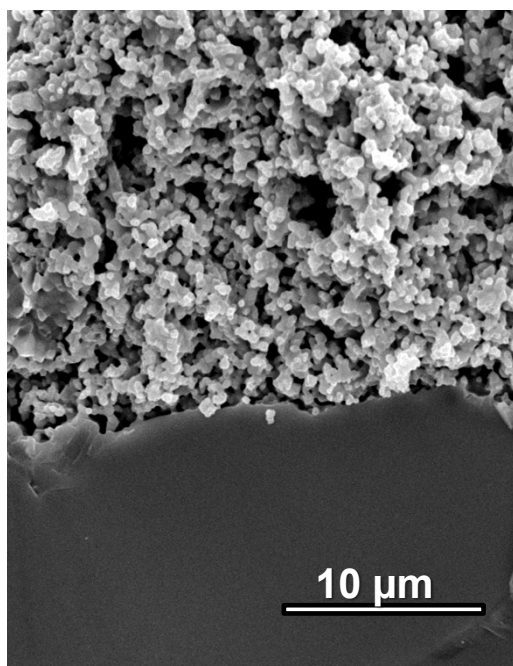


Figure S6. Cross-section micrograph of the symmetrical cell, $\text{SFT}_{0.2}\text{-CGO/LSGM/SFTi}_{0.2}\text{-CGO}$, in different regions.

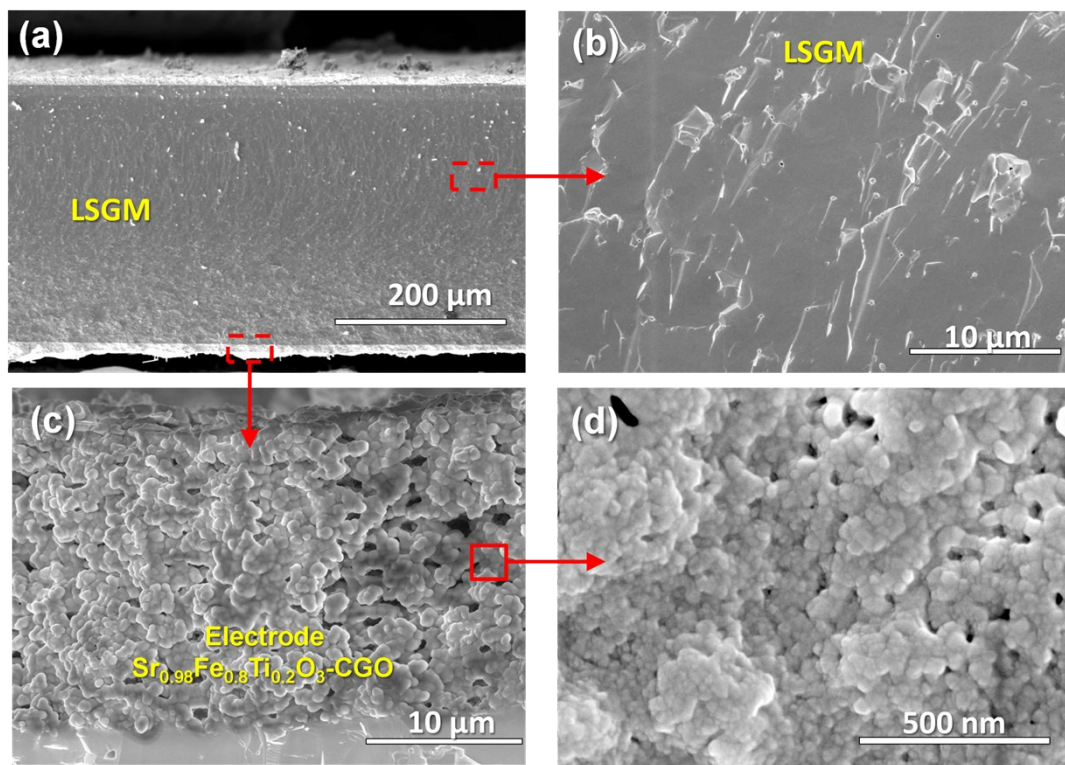


Table S1. R_p values and maximum power densities for different symmetrical electrodes using H_2 as fuel. Only redox stable electrodes are included.

Electrode	Electrolyte	R_p^{air} ($\Omega\text{ cm}^2$)	$R_p^{5\%H_2}$ ($\Omega\text{ cm}^2$)	P(mWcm^{-2})	Ref.
$\text{Sr}_{0.98}\text{Fe}_{0.8}\text{Ti}_{0.2}\text{O}_{3-\delta}$ (SP)	LSGM	0.04 (750 °C)	0.18 (750 °C)	700 (800 °C)	This work
$\text{Sr}_{0.98}\text{Fe}_{0.8}\text{Ti}_{0.2}\text{O}_{3-\delta}$ + 50% CGO (FD)	LSGM	0.32 (750 °C)	1.15 (750 °C)	--	This work
$\text{SrFe}_{0.75}\text{Zr}_{0.25}\text{O}_{3-\delta}$ + 50% CGO	LSGM	0.10 (750 °C)	0.17 (750 °C)	425 (800 °C)	[27]
$\text{Sr}_2\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\delta}$	LSGM	0.24 (780 °C)	0.27 (780 °C)	500 (800 °C)	[9]
$\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$ + YSZ	YSZ	0.60 (750 °C)	1.30 (750 °C)	550 (950 °C)	[4]
$\text{La}_{0.7}\text{Ca}_{0.3}\text{Cr}_{0.97}\text{O}_{3-\delta}$:YSZ (1:1)	YSZ	0.16 (850 °C)	2.00 (850 °C)	50.7 (800 °C)	[7]
$\text{La}_{0.4}\text{Sr}_{0.6}\text{Co}_{0.2}\text{Fe}_{0.7}\text{Nb}_{0.1}\text{O}_{3-\delta}$	LSGM	0.1 (800 °C)	0.28 (800 °C)	380 (800 °C)	[17]
$\text{La}_{1/3}\text{Sr}_{2/3}(\text{Ti}_{1-x}\text{Fe}_x)\text{O}_{3\pm\delta}$	YSZ	0.6 (950 °C)	3.0 (950 °C)	90 (950 °C)	[10]
$\text{La}_{0.8}\text{Sr}_{0.2}\text{Sc}_{0.2}\text{Mn}_{0.8}\text{O}_3$	SSZ	6.5 (850 °C)	0.35 (850 °C)	220 (850 °C)	[8]
$\text{La}_{0.6}\text{Sr}_{0.4}\text{Fe}_{0.9}\text{Sc}_{0.1}\text{O}_{3-\delta}$	LSGM	0.015 (800 °C)	0.29 (800 °C)	560 (800 °C)	[13]
$\text{La}_{0.6}\text{Sr}_{1.4}\text{MnO}_{4-\delta}$	LSGM	2.06 (750 °C)	5.25 (750 °C)	600 (800 °C)	[15]
$\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$ (infiltration)	YSZ	--	--	200 (800 °C)	[30]