

Supplementary Information

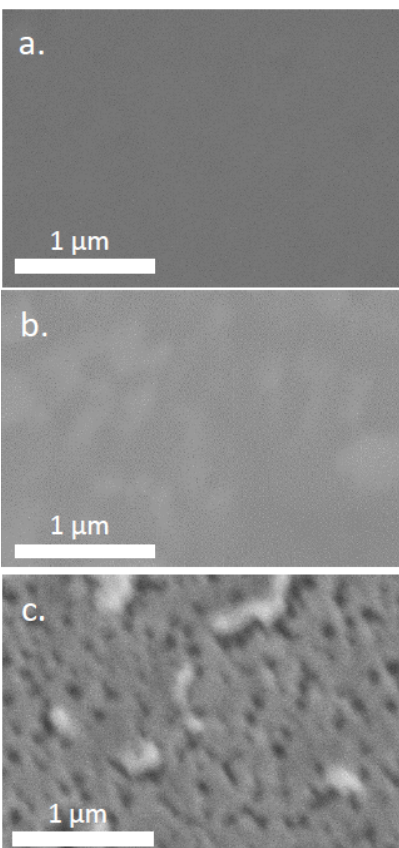


Figure S1 : SEM micrographs of 200 nm Pt strips (a) after deposition and heated at (b) 300°C and (c) 700°C in air during 5h.

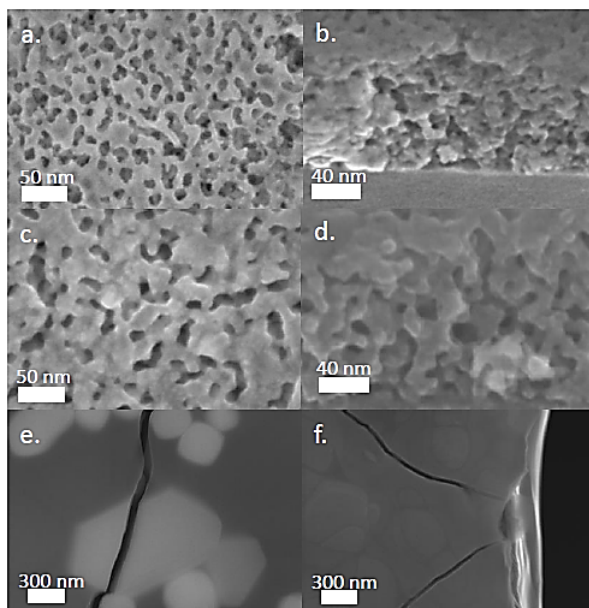


Figure S2: FE-SEM micrographs of LSCF50/50GDC calcined at 500°C (a,b), 700°C (c,d), and 1200°C (e,f) in air during 5h.

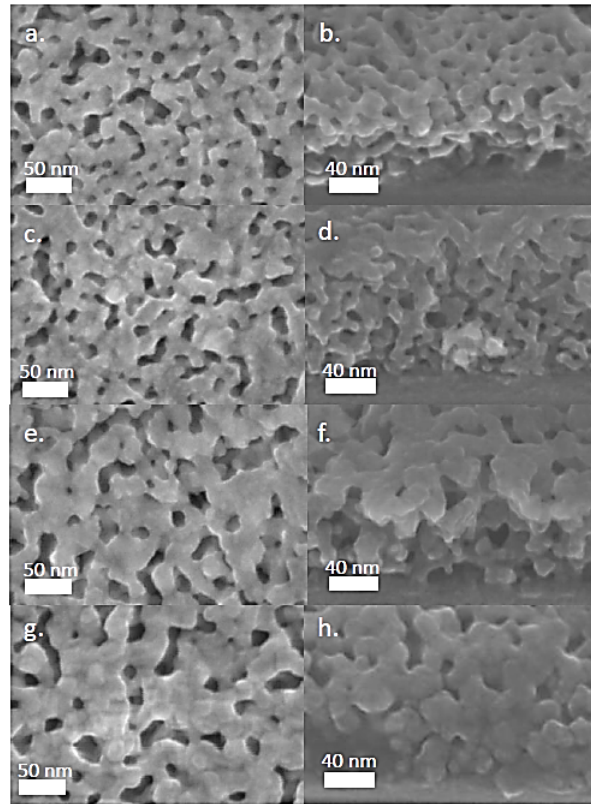


Figure S3: FE-SEM micrographs of LSCF_x/yGDC calcined at 700°C in air during 5h with volumetric % of LSCF 30% (a,b), 50% (c,d), 70% (e,f) and 100% (g,h).

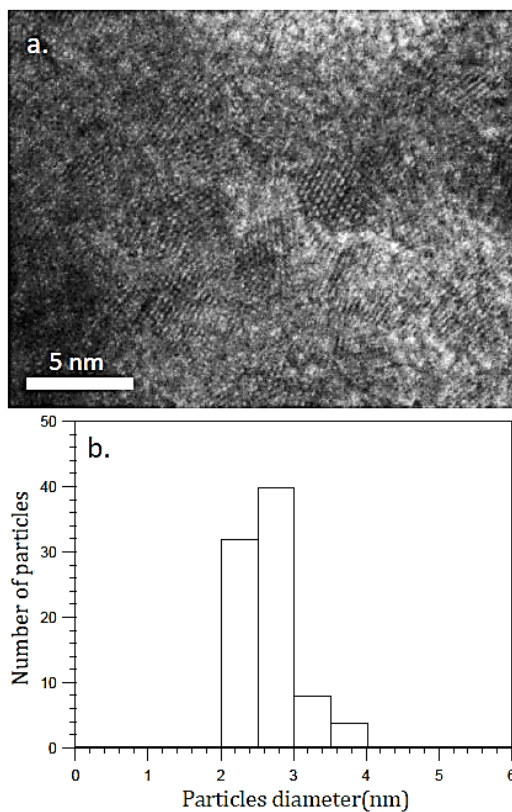


Figure S4. **a.** HR-TEM images of mesostructured, LSCF50/50GDC composite films heat-treated at 500°C, **b.** Distribution of the mean diameter of the nanoparticles evaluated from the HR-TEM images for LSCF50/50GDC mesoporous films heat-treated at 500°C. To evaluate the distribution, the size of ~80 particles has been measured.

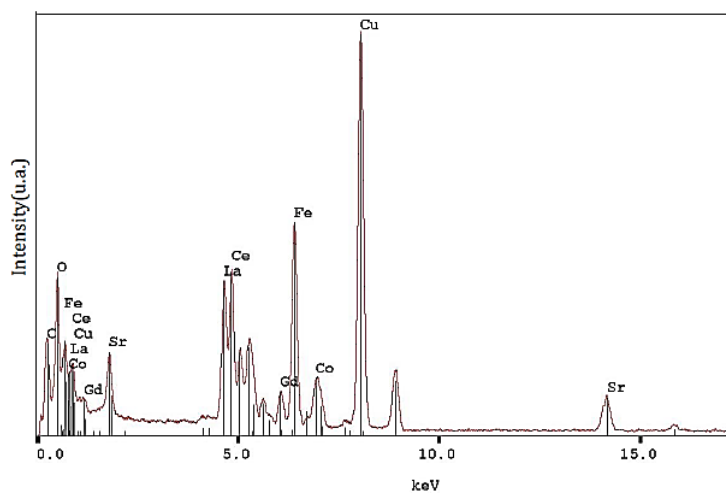


Figure S5: EDX spectrum of LSCF70/30GDC calcined at 700°C in air during 5h.

Tableau 1. Experimental atomic percentages means of La, Sr, Co, Fe, Ce and Gd measured by EDX and theoretical atomic percentages (xx) calculated for porous thin films of LSCF/GDC with 30%, 70% and 100% LSCF volume. The calculated error is equal to 0.5%.

Theoretical x/y	30/70	70/30	100/0
La, at%	6.1 (6.9)	17.8 (18.6)	29.2 (30.0)
Sr, at%	5.0 (4.6)	13.7 (12.4)	21.0 (20.0)
Co, at%	2.5 (2.3)	6.2 (6.2)	10.5 (10.0)
Fe, at%	8.6 (9.2)	25.4 (24.8)	39.5 (40.0)
Ce, at%	69.7 (69.3)	32.5 (34.2)	-
Gd, at%	8.1 (7.7)	4.4 (3.8)	-
x / y	29.2 / 70.8	71.0 / 29.0	100.0 / 0.0
Final composition	$\text{La}_{0.56}\text{Sr}_{0.44}\text{Co}_{0.23}\text{Fe}_{0.77}\text{O}_{3-\delta}$ $\text{Ce}_{0.9}\text{Gd}_{0.1}\text{O}_{2-\delta}$	$\text{La}_{0.56}\text{Sr}_{0.44}\text{Co}_{0.20}\text{Fe}_{0.80}\text{O}_{3-\delta}$ $\text{Ce}_{0.88}\text{Gd}_{0.12}\text{O}_{2-\delta}$	$\text{La}_{0.58}\text{Sr}_{0.42}\text{Co}_{0.21}\text{Fe}_{0.79}\text{O}_{3-\delta}$ -

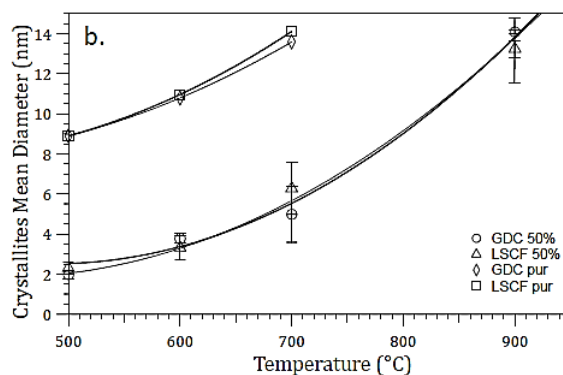


Figure S6: The average crystallite size for LSCF and GDC measured by *ex situ* XRD analysis of LSCF50/50GDC, pure GDC and pure LSCF thin films calcined at various temperatures.