catalysts

SUPPORTING INFORMATION

Sucrose-assisted solution combustion synthesis of doped strontium ferrate perovskite-type electrocatalysts: primary role of the secondary fuel

Maria Laura Tummino [1,2], Leonarda Francesca Liotta [2], Giuliana Magnacca [1,3], Massimiliano Lo Faro [4], Stefano Trocino [4], Sabrina Campagna Zignani [4], Antonino Aricò [4] and Francesca Deganello[2,*]

[1] Università di Torino, Dipartimento di Chimica, Via P. Giuria 7, 10125, Torino, Italy; marialaura.tummino@unito.it (M.L.T.); giuliana.magnacca@unito.it (G.M.)

[2] Istituto per lo Studio dei Materiali Nanostrutturati (ISMN) - Consiglio Nazionale delle Ricerche (CNR) Palermo, Via Ugo La Malfa 153, 90146, Palermo, Italy; francesca.deganello@cnr.it (F.D.); leonardafrancesca.liotta@cnr.it (L.F.L.)

[3] NIS and INSTM Reference Centre, Via P. Giuria 7, 10125 Torino, Italy;

[4] Istituto di Tecnologie Avanzate per l'Energia (ITAE) "Nicola Giordano", via Salita S. Lucia sopra Contesse 5, 98126 Messina, Italy; massimiliano.lofaro@cnr.it (M.L.F.); arico@itae.cnr.it (A.A.); zignani@itae.cnr.it (S.C.Z.); stefano.trocino@itae.cnr.it (S.T.)

* Correspondence: francesca.deganello@cnr.it; Tel.: +39-091-680-9387

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Table S1. Structural and microstructural parameters extracted from Rietveld Refinement of XRD data

Composition & Parameters	SCFC-S	SCFC-SP1	SCFC-SP20
Fuel/fuel mixture	Sucrose	Sucrose+ PEG 1000	Sucrose+ PEG 20000
Cell length: a,b,c (Å)	3.86674 ± 0.00004	3.86616 ± 0.00006	3.86569± 0.00006
V(Å^3)	57.814 ± 0.002	57.789 ± 0.003	57.767± 0.002
ε microstrain (%)	0.105 ± 0.005	0.179 ± 0.009	0.182 ± 0.008
Mean crystal size (nm)	200 ± 7	180 ± 8	192 ± 9
$Sr_{0.85}Ce_{0.15}Fe_{0.67}Co_{0.33}O_{3-\delta}$ (wt%)	100	98.12 ± 0.01	98.29 ± 0.01
CeO_2 (wt%)	0	1.9± 0.1	1.7± 0.1
Agreement Factors			
χ^2	1.89	2.40	2.23
R_P(%)	7.9	8.8	8.5
wR_P(%)	10.0	11.2	10.8
R_F^2(%)	8.3	10.3	9.1

Parameters	SCFC-S	SCFC-SP1	SCFC-SP20
S_{BET} (m^2g^{-1})	27.8	22.0	19.6
[a]Total V_P (cm^3g^{-1})	0.059	0.052	0.050
[b]Mean pore diameter (nm)	4.31	5.42	6.71
[c]Cumulative pore volume (cm^3g^{-1})	0.051	0.043	0.041
[d]Grain size (from S_{BET}) (nm)	374	473	531
[e]Agglomeration degree	1.9	2.6	2.8

Table S2. Textural parameters calculated from N_2 adsorption/desorption measurements

[a]The total Vp has been measured by single point of the desorption branch at p/p_0 =0.99

[b] The mean pore diameter and [c]cumulative pore volume have been calculated by BJH method applied to the desorption branch.

[d] Grain size was calculated following the equation also used by Ahsanzadeh-Vadeqani in ref. 62 and the density value was obtained from Rietveld analysis (5.769 g/cm^3)

[e] agglomeration degree has been estimated by the ratio between the crystal size obtained from XRD and the grain size obtained from N_2 adsorption

Table S3. Hydrogen consumptions (ml/g) per range of temperatures and total hydrogen consumption calculated from temperature programmed reduction experiments

Temperature ranges (°C)	SCFC-S	SCFC-SP1	SCFC-SP20
100-290 °C (Fe^{4+}/Fe^{3+}; Co^{4+}/Co^{3+})	14.7	17.3	17.6
290-580 °C (Co^{3+}/Co^{2+}; Co^{2+}/Co^{0})	48.5	47.3	47.3
580-1000 °C (Ce^{4+}/Ce^{3+}; Fe^{3+}/Fe^{2+}; Fe^{2+}/Fe^{0})	121.0	117.0	116.8
100-1000 °C (total consumption)	184.2	181.6	181.7

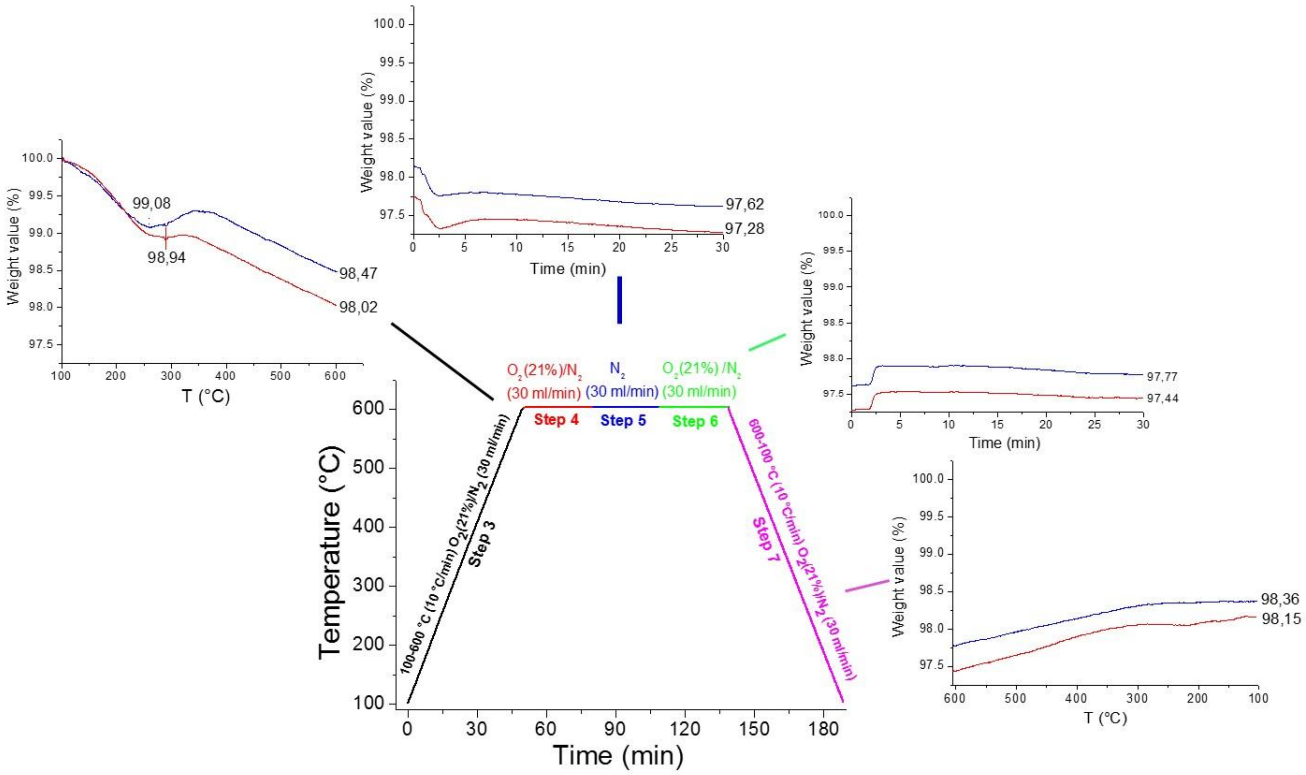

Figure S1: experimental conditions used and weight loss variation in the second TGA experiment