Supporting Materials: Segregation of Nickel/Iron Bimetallic Particles from Lanthanum Doped Strontium Titanates to Improve Sulfur Stability of Solid Oxide Fuel Cell Anodes

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Table S1. Sample denotations and corresponding metal loadings (wt%), metal precursors and support materials used during synthesis.

Denotation	Loading [wt%]	Metal precursor for wet impregnation	Support
LST	-	-	$La_{0.3}Sr_{0.55}TiO_{3\pm\delta}$
LST-5Ni	1.6	$Ni(NO_3)_2{\cdot}6H_2O$ (Sigma, ≥ 99.999%)	
LST-5Fe	1.5	$Fe(NO_3)_3{\cdot}9H_2O$ (Sigma, ≥ 99.95%)	
LST-5Cr	1.4	$Cr(NO_3)_3{\cdot}9H_2O$ (Sigma, 99%)	
LST-5Mn	1.5	$Mn(NO_3)_2{\cdot}4H_2O$ (Sigma, ≥ 97.0%)	
LST-5Mo	2.6	$(NH_4)_6Mo_7O_{24}{\cdot}4H_2O$ (Fluka, ≥ 99.0%)	
LSTN	-	-	$La_{0.3}Sr_{0.55}Ti_{0.95}Ni_{0.05}O_{3\pm\delta}$ (1.6 wt% Ni)
LSTN-5Fe	1.5	$Fe(NO_3)_3{\cdot}9H_2O$ (Sigma, ≥ 99.95%)	
LSTN-5Cr	1.4	$Cr(NO_3)_3{\cdot}9H_2O$ (Sigma, 99%)	
LSTN-5Mn	1.5	$Mn(NO_3)_2{\cdot}4H_2O$ (Sigma, ≥ 97.%)	
LSTN-5Mo	2.6	$(NH_4)_6Mo_7O_{24}{\cdot}4H_2O$ (Fluka, ≥ 99.0%)	

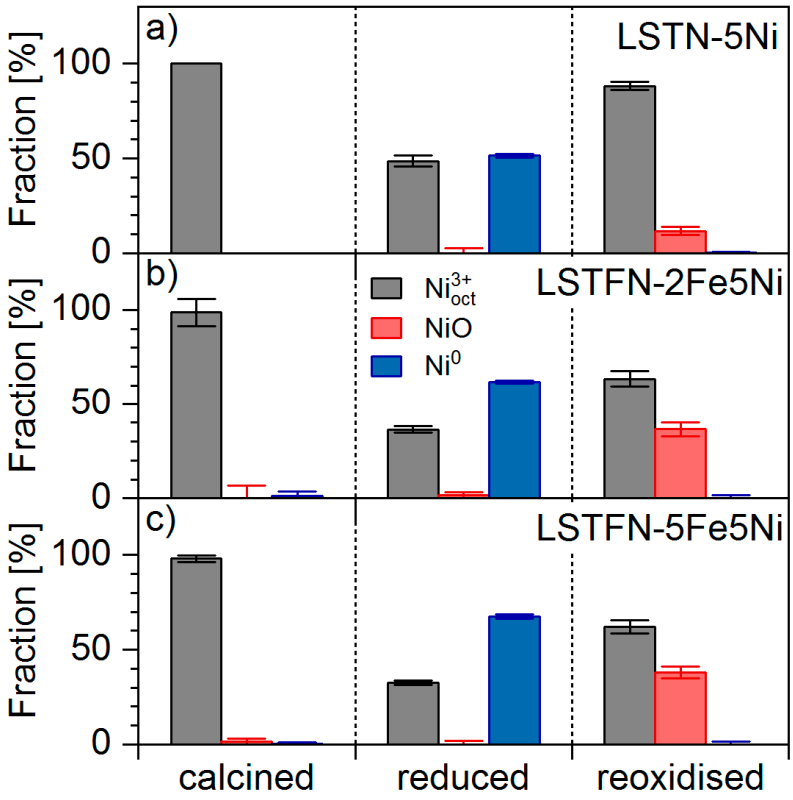

Figure S1. Nickel speciation obtained from linear combination fit of Ni K-edge (8.333 keV) XANES spectra of calcined, reduced (10 vol% H_2/Ar, 800 °C, 15 h) and reoxidized (20 vol% O_2/N_2, 800°C, 2 h) materials; **a**) LSTN-5Ni, **b**) LSTFN-2Fe5Ni and **c**) LSTFN-5Fe5Ni. Nickel reference spectra for linear combination fits were obtained on Ni foil (Ni^0), NiO, and LSTN.

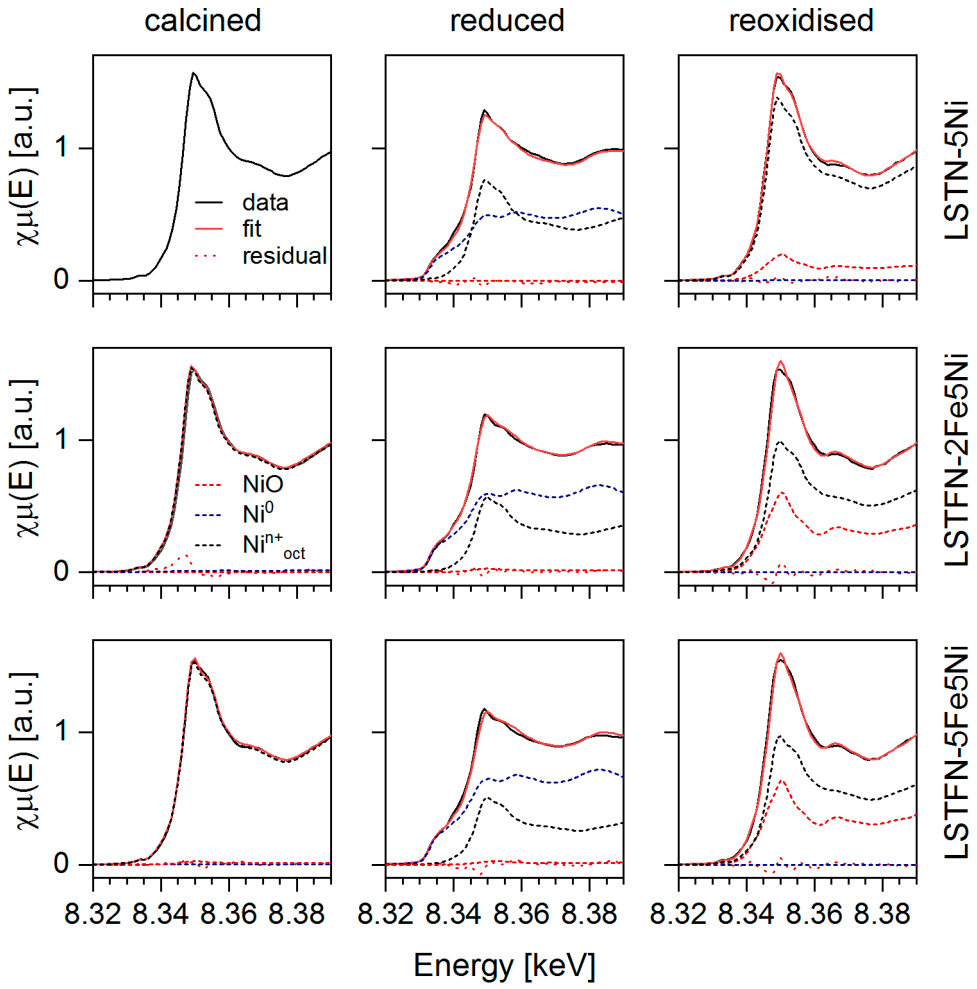

Figure S2. Ni K-edge XANES linear combination fit results of calcined, reduced (10 vol% H_2/Ar, 800 °C, 1 h) and reoxidized (20 vol% O_2/N_2, 800 °C, 2 h) LSTN-5Ni, LSTFN-2Fe5Ni and LSTFN-5Fe5Ni. Corresponding compositions are shown in Figure S1. The reference spectra used for the fit correspond to the Ni foil, LSTN (for Ni^{n+}_{oct}) and NiO and the individual reference spectra contribution are represented by the dashed lines.

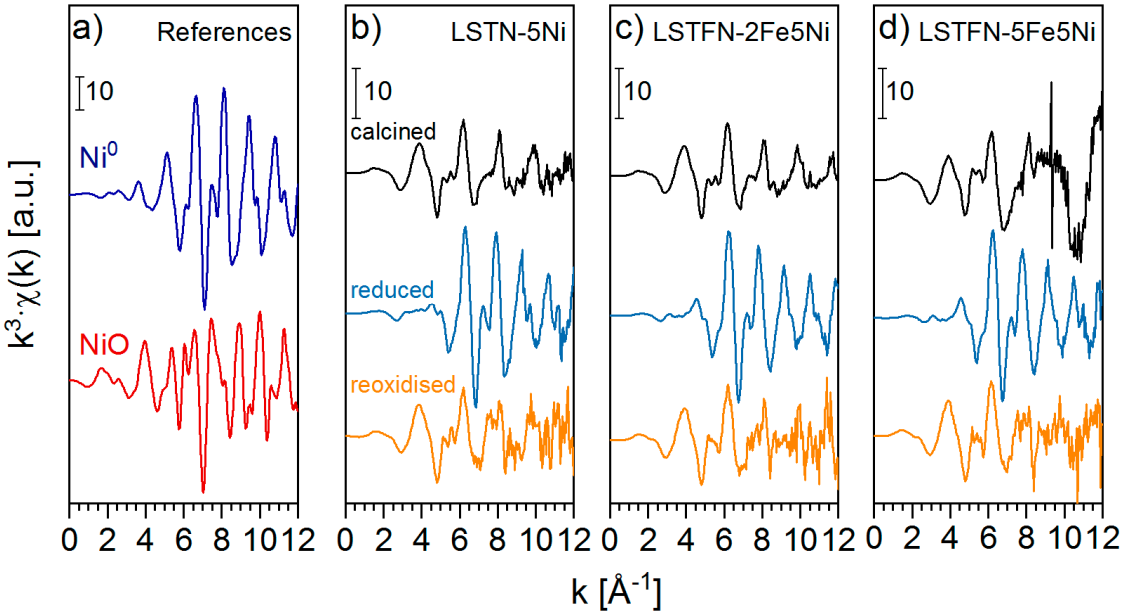

Figure S3. EXAFS plots of k^3-weighted $\chi(k)$ collected around the Ni K-edge (8.333 keV) of **a**) Ni^0 and NiO reference materials, **b**) LSTN-5Ni, **c**) LSTFN-2Fe5Ni and **d**) LSTFN-5Fe5Ni in their calcined, reduced (10 vol% H_2/Ar, 800 °C, 15 h) and reoxidized (20 vol% O_2/N_2, 800 °C, 2 h) states.

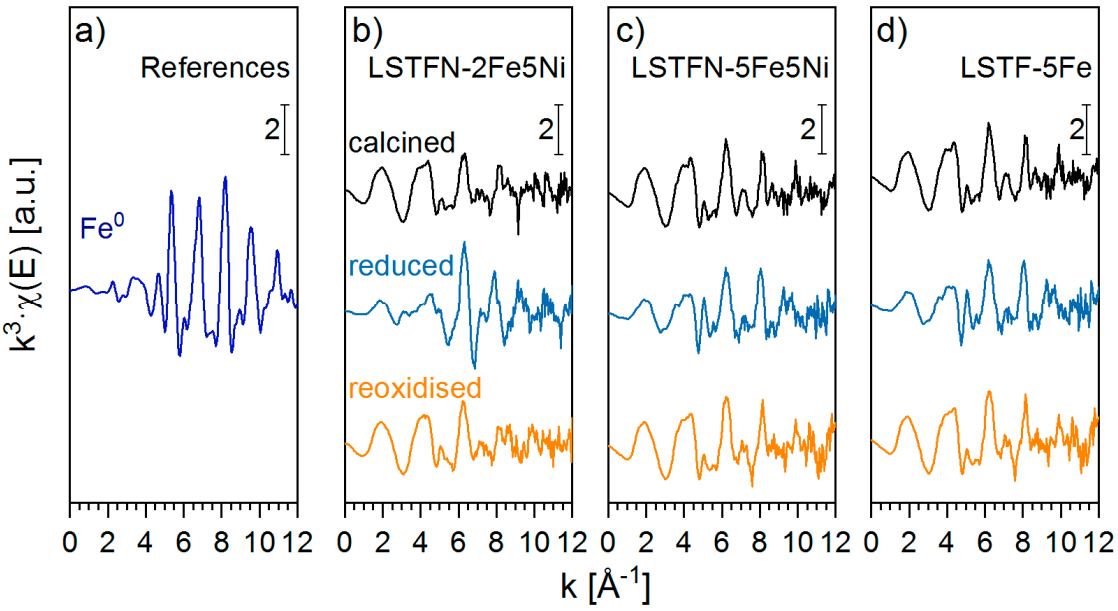

Figure S4. EXAFS plots of k^3-weighted $\chi(k)$ collected around the Fe K-edge (7.112 keV) of **a**) Fe^0 reference, **b**) LSTFN-2Fe5Ni, c) LSTFN-5Fe5Ni and d) LSTF-5Fe in their calcined, reduced (10 vol% H_2/Ar, 800 °C, 15 h) and reoxidized (20 vol% O_2/N_2, 800 °C, 2 h) states.