Electronic Supplementary Material (ESI) for RSC Advances

Oxygen-loss in A-site deficient $Sr_{0.85}La_{0.10}TiO_3$ perovskite

Ipek Akin[1], Ming Li[2], Zhilun Lu[2], Derek C. Sinclair[2,*]

[1]Department of Metallurgical and Materials Engineering, Istanbul Technical University, Istanbul, 34469, Turkey

[2]Department of Materials Science & Engineering, University of Sheffield, Sheffield, S1 3JD, UK

*Corresponding Author's e-mail: d.c.sinclair@sheffield.ac.uk

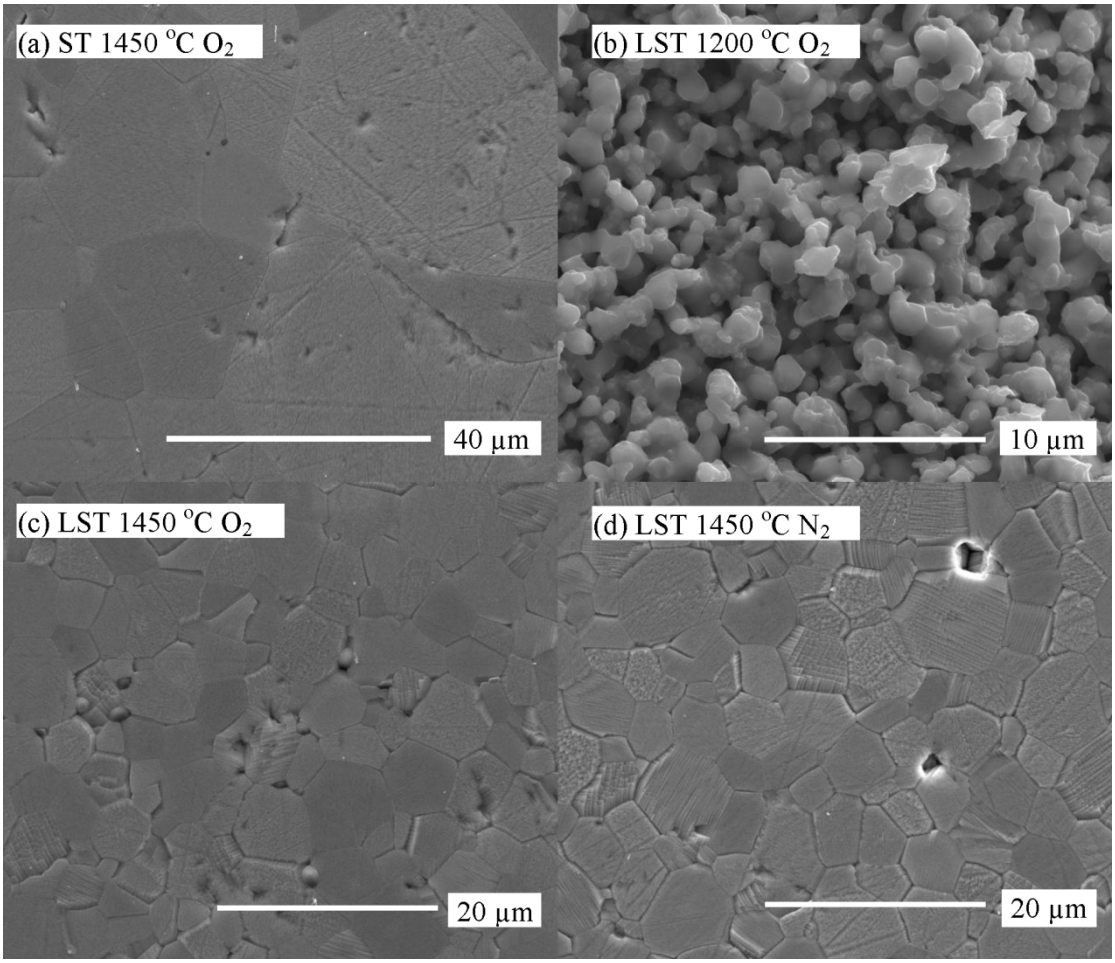

Fig. S1. SEM images of representative samples: (a) ST sintered at 1450 °C in O_2, (b) LST sintered at 1200 °C in O_2, (c) LST sintered at 1450 °C in O_2 and (d) LST sintered at 1450 °C in N_2

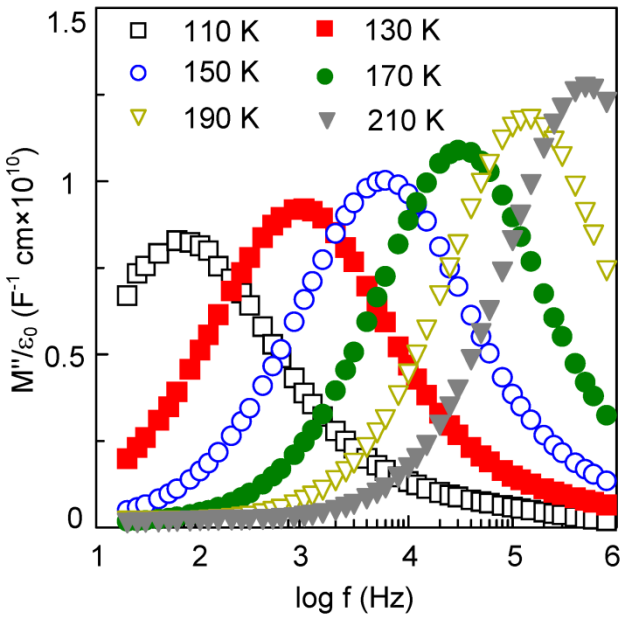

Fig S2. Imaginary components of electric modulus (M") spectroscopic plots for LST ceramics sintered at 1450 ^{o}C in O_2.

The magnitude of M" peak height and its temperature dependence are consistent with the bulk behavior for ST-based materials.

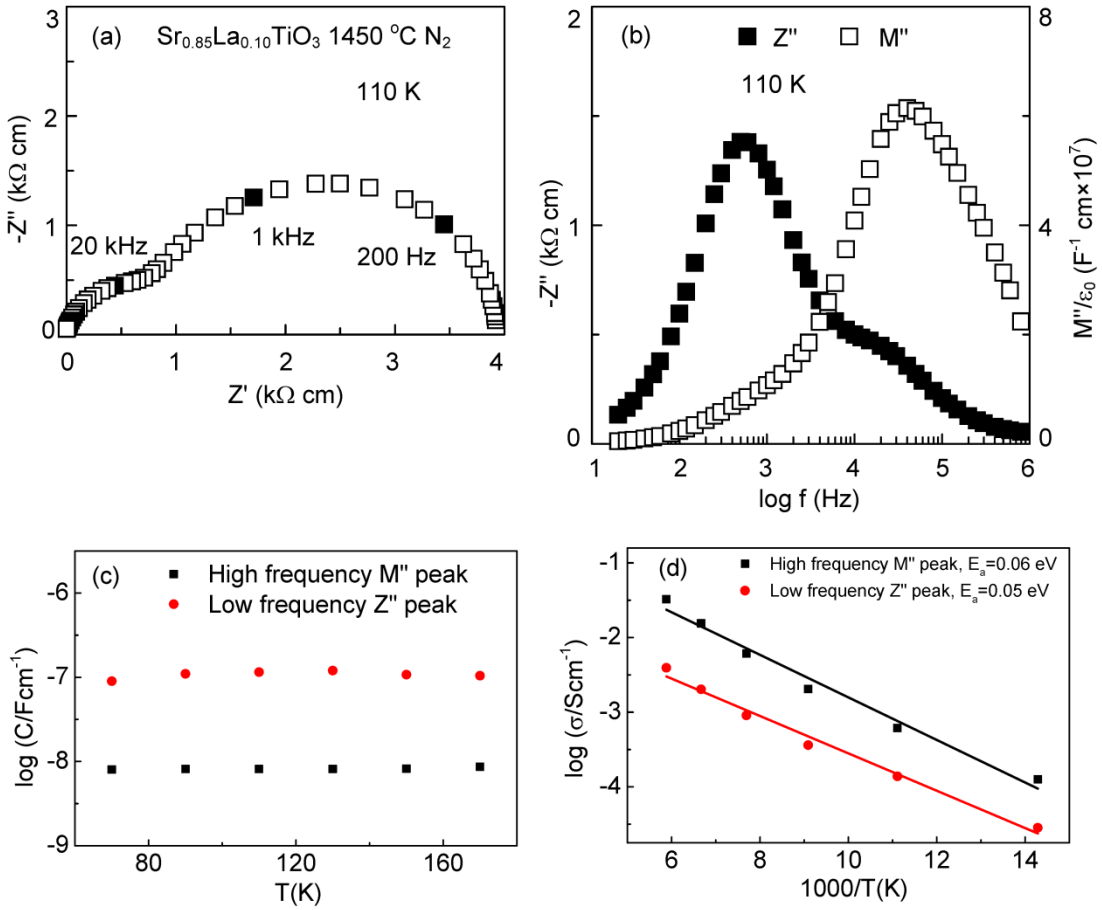

Fig S3. (a) Z* plot at 110 K, (b) combined spectroscopic plots of the imaginary components of impedance, Z'' and electric modulus, M'', at 110 K for LST ceramics sintered at 1450 °C in N_2; (c) capacitance as a function of temperature and (d) Arrhenius-type plots of conductivity for the high and low frequency responses. The capacitance and conductivity are extracted from Z''/M'' plots.

Two semiconducting components were observed in the range 70-170 K for LST ceramics sintered at 1450 °C in N_2. Both components exhibit high capacitance values (10^{-8}-10^{-7} F cm^{-1}), suggesting neither of them is associated with a bulk response. The low frequency component is likely to be associated with a non-ohmic sample-electrode contact effect whereas the high frequency component is associated with a residual surface layer/grain boundary response.