

Supporting Information

Surface and Bulk Study of Strontium-Rich Chromium Ferrite Oxide as a Robust Solid Oxide Fuel Cell Cathode

Min Chen, Scott Paulson, Wang Hay Kan, Venkataraman Thangadurai and Viola Birss *

Department of Chemistry, University of Calgary, Calgary, AB T2N 1N4 (Canada)

*Corresponding Author Email: birss@ucalgary.ca

Table S1. Electrical conductivity, average thermal expansion coefficients, and area specific resistance of a range of iron-based perovskite electrodes with the B-site iron lightly substituted by a high valence transition metal.

Compositions	Conductivity at 600-800°C in air (S•cm ⁻¹)	Average TEC (×10 ⁻⁶ K ⁻¹)	ASR in symmetrical half cell (Ω•cm ²)	Ref.
(1) BaFe _{0.95} Nb _{0.05} O _{3-δ}	4 - 8	19.3 (RT-1000°C)	0.016 (750°C, SDC)	16
(2) Ba _{0.5} Sr _{0.5} Fe _{0.9} Nb _{0.1} O _{3-δ}	7 - 9	19.2 (RT-1000°C)	0.033 (750°C, SDC)	17
(3) SrFe _{0.9} Nb _{0.1} O _{3-δ}	34-70	22.1 (RT-1000°C)	0.031 (750°C, SDC)	18
(4) SrFe _{0.8} Mo _{0.2} O _{3-δ}	30 - 45	25.7 (RT - 800°C)	0.074(800°C, LSGM)	18
(5) SrFe _{0.75} Ti _{0.25} O _{3-δ}	38 - 40		0.083(800°C, LSGM)	18
(6) SrFe _{0.75} Cr _{0.25} O _{3-δ}	28- 30		0.062(800°C, LSGM)	18
(7) Sr ₂ Fe _{1.5} Mo _{0.5} O _{6-δ}	50 - 600	18.1 (200 - 1200°C)	0.240 (800°C, LSGM)	18
(8) La _{0.3} Sr _{0.7} Fe _{0.7} Cr _{0.3} O _{3-δ}	74 - 103	16.3 (50 - 900°C)	0.105 (800°C, LSGM)	19
(9) La _{0.6} Sr _{0.4} Fe _{0.8} Co _{0.2} O _{3-δ}	375 - 425	16.8(100 - 900°C)	0.180 (800°C, SDC)	20

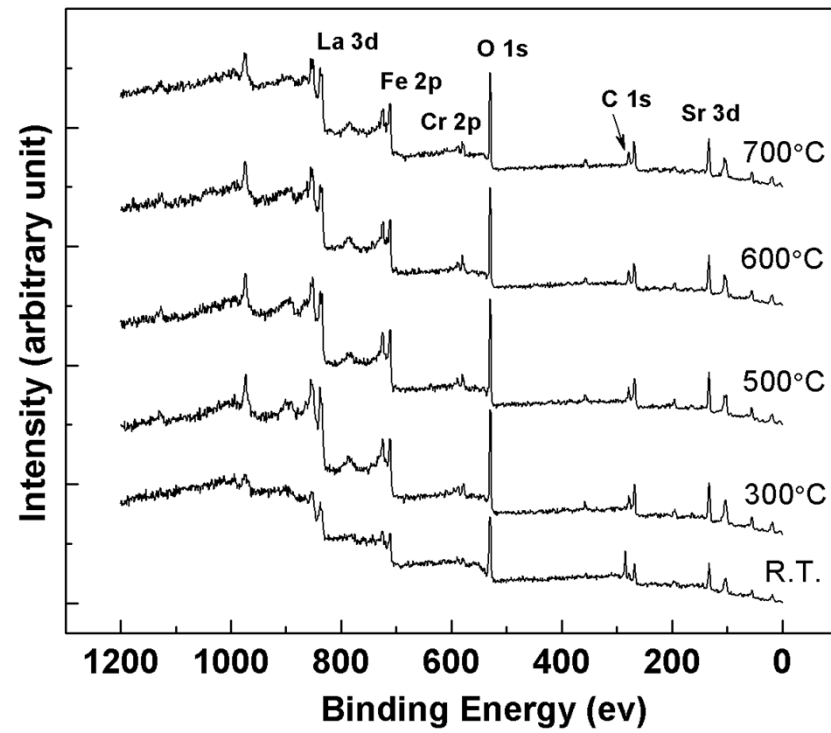


Fig. S1. Low resolution (survey scan) *in-situ* XPS spectra of $\text{La}_{0.3}\text{Sr}_{0.7}\text{Fe}_{0.7}\text{Cr}_{0.3}\text{O}_{3-\delta}$ specimen from room temperature (R.T.) to 700 °C.

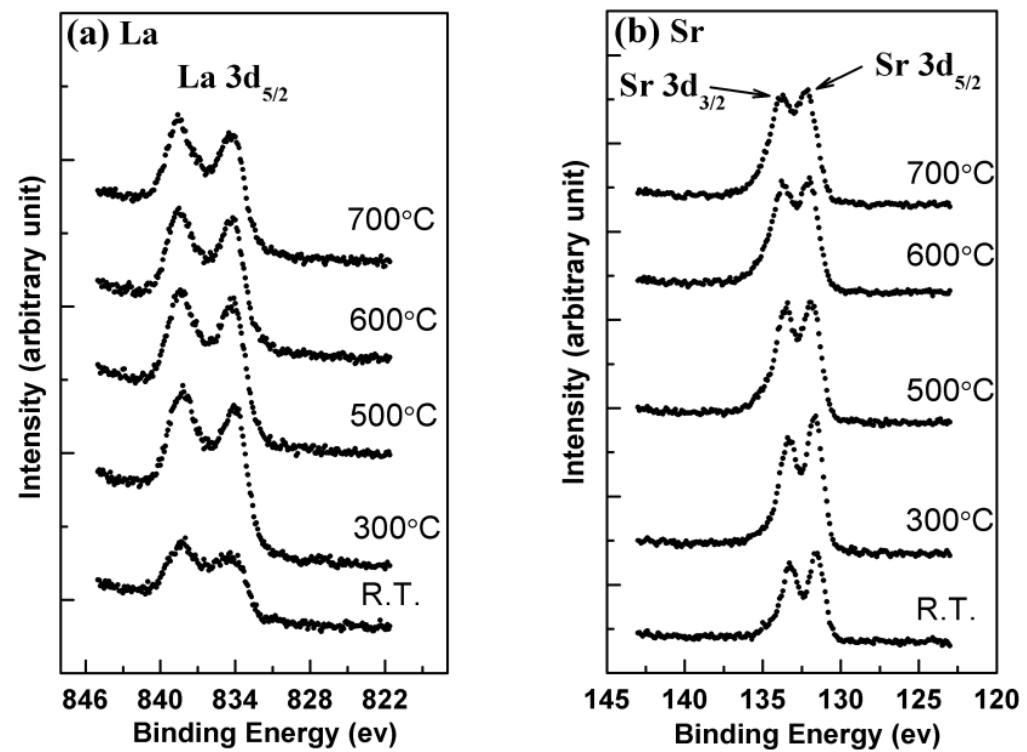


Fig. S2. High resolution *in-situ* XPS spectra of (a) La 3d_{5/2} and (b) Sr 3d collected from room temperature (R.T.) to 700 °C.

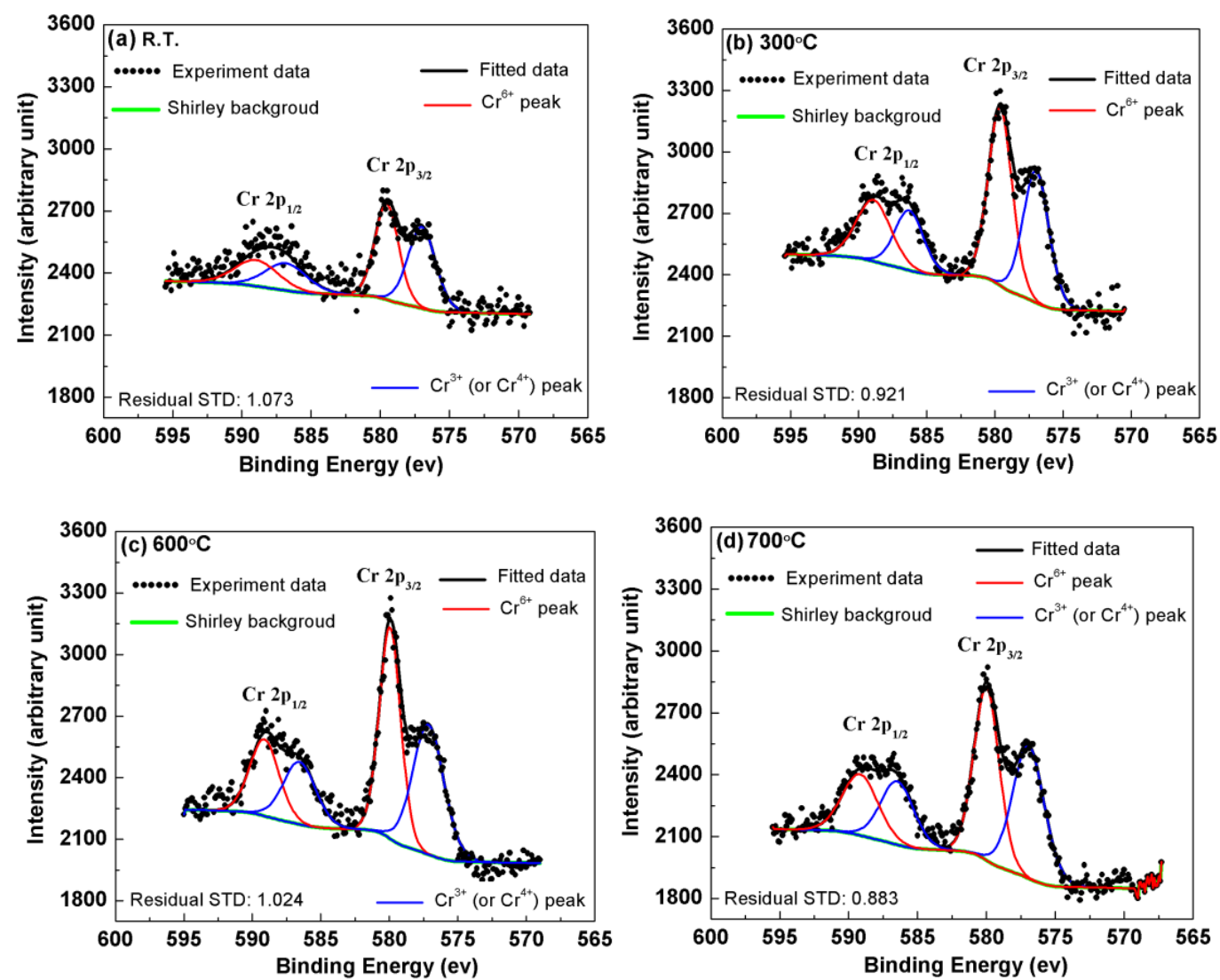


Fig. S3. Fitting patterns of Cr 2p_{3/2} spectrum for the LSF_{Cr-3} specimen collected from room temperature to 700 °C.