Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.
This journal is © The Royal Society of Chemistry 2017

Supporting information

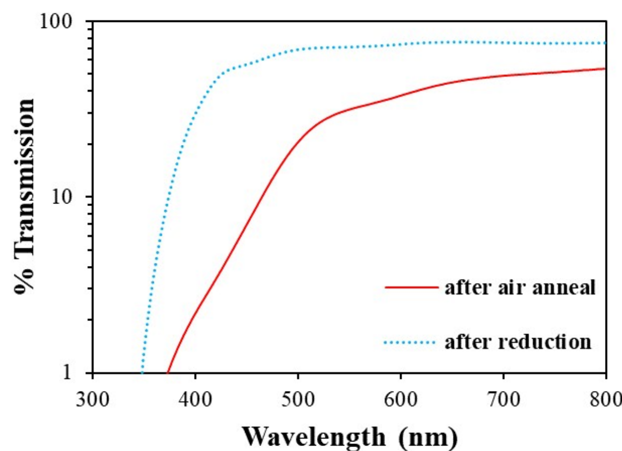
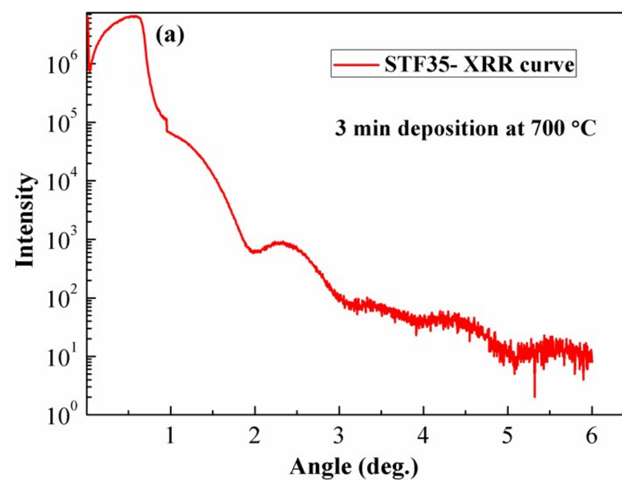


Figure S1. Representative light transmission spectra for STF35 film grown at 700 °C, post-annealed in air or 4%H_2/96%N_2 at 500 °C for 5 h, and measured in air at room temperature.



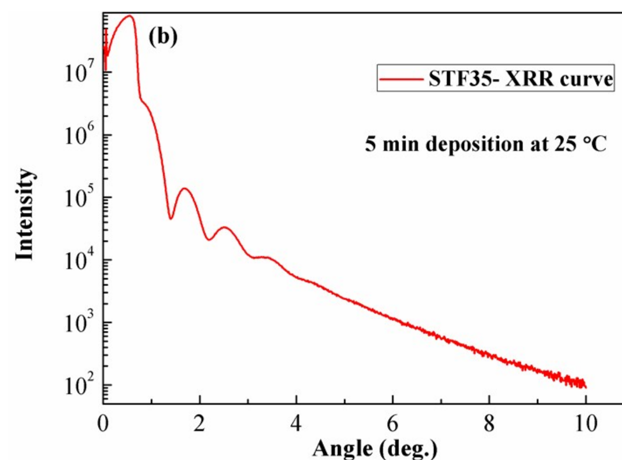


Figure S2. X-ray reflectivity (XRR) curves of STF35 thin films grown by PLD: a) 3 min deposition at 700 °C (3.7 nm thick); b) 5 min deposition at 25 °C (4.7nm thick).

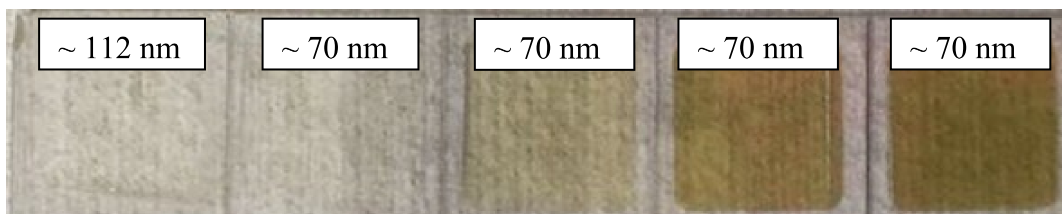


Figure S3. Photograph of 25 °C, 400 °C, 580 °C, 700 °C and 800 °C-grown STF35 thin films (increasing growth temperature from left to right) on YSZ substrates. Films are 70-112 nm thick, as labeled.

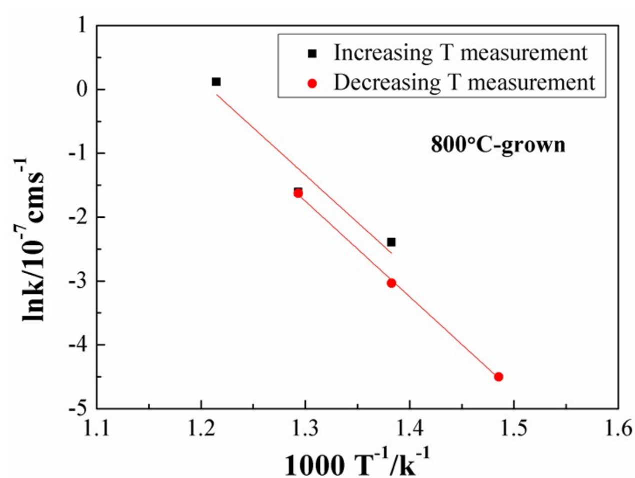


Figure S4. Arrhenius plot of k_{chem} for 800 °C-grown thin film during heating (first) and cooling (second) measurements showing repeatable activation energy, 1.28 eV and 1.29 eV, respectively.

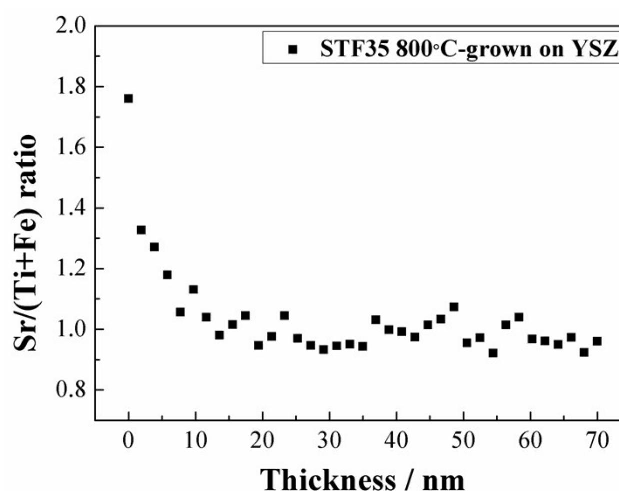


Figure S5. XPS depth profile (by sputtering) for 800 ºC-grown thin film

Table S1. The chemical oxygen surface exchange coefficient of 700 ºC -grown STF35 thin film after 100 h aging with 5 times redox cycling (21% / 4% O_2)

$k/10^{-7} cms^{-1}$	1st reduction	2nd	3rd	4th	5th
600 ºC	2.86	2.46	2.18	2.17	1.79
550 ºC	0.108	0.105	0.104	0.097	0.094