Abstract Submitted
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Tracking Oxygen Vacancies in Thin Film SOFC Cathodes[1] DONOVAN LEONARD, AMIT KUMAR, STEPHEN JESSE, SERGEI KALININ, Oak Ridge National Laboratory, YANG SHAO-HORN, ETHAN CRUMLIN, EVA MUTORO, Massachussetts Institute of Technology, MICHAEL BIEGALSKI, HANS CHRISTEN, STEPHEN PENNYCOOK, ALBINA BORISEVICH, Oak Ridge National Laboratory — Oxygen vacancies have been proposed to control the rate of the oxygen reduction reaction and ionic transport in complex oxides used as solid oxide fuel cell (SOFC) cathodes [1,2]. In this study oxygen vacancies were tracked, both dynamically and statically, with the combined use of scanned probe microscopy (SPM) and scanning transmission electron microscopy (STEM). Epitaxial films of $La_{0.8}Sr_{0.2}CoO_3$ (LSC_{113})and LSC_{113}/$LaSrCoO_4$(LSC_{214}) on a GDC/YSZ substrate were studied, where the latter showed increased electrocatalytic activity at moderate temperature. At atomic resolution, high angle annular dark field STEM micrographs revealed vacancy ordering in LSC_{113} as evidenced by lattice parameter modulation and EELS studies. The evolution of oxygen vacancy concentration and ordering with applied bias and the effects of bias cycling on the SOFC cathode performance will be discussed.

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