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Electronic structure of $La_{1-x}Sr_xCoO_{3-\delta}$ in the presence of ordered oxygen vacancies[1] JAUME GAZQUEZ, M. VARELA, Oak Ridge National Laboratory, M.P. OXLEY, W. LUO, S.T. PANTELIDES, Vanderbilt Univ., M.A. TORIJA, M. SHARMA, C. LEIGHTON, Univ. of Minnesota, S.J. PENNYCOOK, Oak Ridge National Laboratory — Here we present a study of oxygen vacancy ordering in $La_{1-x}Sr_xCoO_{3-\delta}$ (LSCO) thin films using a combination of atomic resolution Z-contrast imaging and electron energy-loss spectroscopy (EELS). Substituting Sr^{2+} for La^{3+} in $LaCoO_3$ results in either the formation of oxygen vacancies or an increase in the mean cobalt valence in order to preserve charge neutrality. At large concentrations, oxygen vacancies in LSCO form ordered structures with orientations determined by epitaxial strain. This talk will show how different O K-edge fine structures can be observed in EEL spectra obtained from different sites of the superstructure, while the Co L-edges are unchanged. These results, together with density functional theory and dynamical scattering calculations, suggest that there is no charge ordering but a modulation of the hole doping in these systems.

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