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Electronic structure of $La_{1-x}Sr_xCoO_3$ investigated from doping evolution of its soft x-ray spectra YINWAN LI, DAVID EDERER, Tulane University, THOMAS CALLCOTT, University of Tennessee, J. W. FREELAND, Argonne National Laboratory — Perovskite cobalt oxide $LaCoO_3$ attracted a lot of attention because of its spin state transition around 90K, the interpretation of which is still under debate. We performed soft X-ray absorption and emission experiments on $La_{1-x}Sr_xCoO_3$ at O-K edge and Co-L edge with various doping from x = 0 to x = 30. The doping evolution of the spectra can be understood as a result of introduction of holes at the top of valence band accompanied with a lowering of the Fermi level. The significant change of oxygen K edge spectra with doping indicates that the top of the valence band is largely of oxygen character, indicating strong Co 3d – O 2p hybridization. The bottom of unoccupied band has a double peak feature indicating a splitting e_g band. This split is the largest in the undoped sample and becomes smaller with doping. A gap of less than 1eV is observed from the excitation feature in the emission spectra and its change with doping again indicates a lower Fermi level in doped samples.

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