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Competition between covalent bonding and charge transfer tendencies at complex-oxides interfaces J. SALAFRANCA, J. TORNOS, J. GARCÍA-BARRIOCANAL, C. LEÓN, J. SANTAMARIA, Universidad Complutense de Madrid, J. RINCÓN, G. ÁLVAREZ, S.J. PENNYCOOK, Oak Ridge National Laboratory, E. DAGOTTO, Oak Ridge National Laboratory and University of Tennessee, M. VARELA, Oak Ridge National Laboratory and U. Complutense de Madrid — Interfaces alter the subtle balance among different degrees of freedom responsible for exotic phenomena in complex oxides, such as cuprate-manganite interfaces. We study these interfaces by means of scanning transmission electron microscopy and theoretical calculations. Microscopy and EEL spectroscopy indicate that the interfaces are sharp, and the chemical profile is symmetric with two equivalent interfaces. Spectroscopy also allows us to establish an oxidation state profile with sub-nanometer resolution. We find an anomalous charge redistribution: a non-monotonic behavior of the occupancy of d orbitals in the manganite layers as a function of distance to the interface. Relying on model calculations, we establish that this profile is a result of the competition between standard charge transfer tendencies involving materials with different chemical potentials and strong bonding effects across the interface. The competition can be tuned by different factors (temperature, doping, magnetic fields...). As examples, we report different charge distributions as a function of doping of the manganite layers. ACKNOWLEDGEMENTS ORNL:U.S. DOE-BES, Material Sciences and Engineering Division & ORNL's ShaRE. UCM:Juan de la Cierva, Ramon y Cajal, & ERC Starting Investigator Award programs.

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