Abstract Submitted
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Electronic structure of $Lu_{1-x}La_xVO_3$ single crystals using soft x-ray spectroscopy[1] BO CHEN, JUDE LAVEROCK, JAMES MCNULTY, DAVE NEWBY, KEVIN SMITH, Boston University, ANDERS GLANS, JINGHUA GUO, Advanced Light Source, GEETHA BALAKRISHNAN, RAVI SINGH, University of Warwick — The rare-earth vanadates, RVO_3, offer a rich phase diagram of both orbital and spin ordering phenomena, stemming from their two-fold occupation of the three-fold degenerate V t_{2g} orbitals. It has been discussed that, in RVO_3, which shows the t_{2g} orbital ordering, the Jahn-Teller coupling suppression is much weaker than that in the e_g electron systems. In order to address the orbital ordering effects, we report soft x-ray measurements of $Lu_{1-x}La_xVO_3$ single crystals, which approach both the smallest and largest rare-earth ionic sizes. X-ray absorption spectroscopy and x-ray emission spectroscopy, which reveal both the unoccupied and occupied partial density of states, are employed to observe the changes in the V $3d$ and O $2p$ states, across the orbital ordering transitions and R-site ionic radii. Also, resonant inelastic x-ray scattering is applied to probe the O $2p$-V $3d^*$ charge transfer excitations and V $3d$-$3d^*$ transitions. Together, these complementary techniques provide a picture of the electronic structure of $Lu_{1-x}La_xVO_3$ to test the role of the orbital ordering during phase transitions with varying rare-earth ionic sizes.

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