Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Temperature and high-pressure dependent X-ray absorption of $SmNiO_3$ at K-Ni and Sm-L_3 edges N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, La Plata, Argentina, A.Y. RAMOS, H.C.N. TOLENTINO, Inst. Neel-CNRS, F-38042 Grenoble. France, N. SOUSA NETO, J. FONSECA JR., LNLS, 13084-971, Campinas, Sao Paulo, Brazil, M.J. MARTINEZ-LOPE, J.A. ALONSO, ICMM-CSIC, Madrid, Spain — We report XANES and EXAFS measurements of $SmNiO_3$ from 20 K to 600 K and up to 38 GPa done at LNLS, Campinas, Brazil, in the DXAS energy dispersive beamline. $SmNiO_3$ undergoes an atmospheric pressure insulator to metal transition at $T_{IM} \sim 400$ K, orders magnetically at $T_N \sim 205$ K, and shares with all $RNiO_3$ (R=Rare Erath) a negative $-dT_{MI}/dP$ slope. Ni white line peak energies show an abrupt 2.4 GPa and 8.11 GPa valence discontinuity at 300 K and at 20 K respectively, due to non-equivalent Ni sites with $Ni^{3+\delta}$+ $Ni^{3-\delta}$ charge disproportion in a monoclinic distortion turning at T_{MI} into Ni^{3+} in the orthorhombic Pbnm metal oxide phase. Increasing pressure induces Ni-O-Ni angle increments toward more symmetric Ni^{3+} octahedra of rhombohedral R^- 3c space group (metallic $LaNiO_3$). At 38 GPa, there is a clear split of the main EXAFS band according to cell volume decrease due to contraction. Pre-edge tail accounts for e_g-t_{2g} splitting and a stronger band growing in intensity in the higher symmetry metallic phases associated to e_g electron delocalization hopping conductivity. The Ni^{3+} post-edge becomes smoother and intensity increased by the reduction of electron-phonon interaction as the pressure-induced phases set in. We also found that Sm L_3-edge does not show distinctive behaviors either at 300 K or 20 K up about 35 GPa.

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Date submitted: 13 Nov 2014 Electronic form version 1.4