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Local structure studies of multiferroic RMn2O5 (R=Bi, Pr, Gd)[1]
G. FABBRIS, LNLS/IFGW-UNICAMP, Campinas, Brazil, N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, cc962, 1900 La Plata, Argentina, E. GRANADO, IFGW-UNICAMP/LNLS, Campinas, Brazil, G.A. MACIEL, IF-UFPR, Curitiba, Brazil, J.A. SOUZA, CCNH-UFABC, Santo André, Brazil, J.A. ALONSO, M.J. MARTINEZ, CSIC-ICMM-Cantoblanco, E28049 Madrid, Spain, G.M. AZEVEDO, LNLS, Campinas, Brazil — EXAFS measurements from 20 K to 300K were used to investigate the local structure of multiferroic RMn_2O_5 (R = Bi, Pr, Gd, TM TC 40K) in transmission mode at the Mn K- and R L_3- edges in the XAFS2LNLS beamline and analyzed using the IFEFFIT and FEFF codes. For $BiMn_2O_5$, Mn K-edge reveals very small temperature dependence of the Debye-Waller factor (DWF) and an Einstein temperature (ET) from Mn-O bonds of 675±22 K, suggesting that MnO polyhedra are rigid. We find structural distortions in the first coordination shell at the Bi L_3-edge associated to vibrational anomalies in the Bi-O bonds. The quantitative analysis relates the origin of such distortions to two very distinct values of DWT and ET (294±7K and 462±28K) for these bonds on first shell. Similar behavior is observed for $PrMn_2O_5$, and $GdMn_2O_5$.

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