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**High Temperature Far Infrared Emissivity, Reflectivity, and X-ray Absorption of $BiFeO_3$** N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, La Plata, Argentina, L. DEL CAMPO, D. DE SOUSA MENESES, P. ECHEGUT, CNRS-CEMHTI, Orleans, France , G.F.L. FABBRIS, G. AZEVEDO, LNLS, Campinas, Brazil, M.J. MARTINEZ-LOPE, J.A. ALONSO, ICMM-CSIC, Madrid, Spain — We outline the temperature dependent lattice dynamics of $BiFeO_3$ from 4 K to melting by combining far infrared emissivity and reflectivity. The TO low temperature unstable phonon ceases softening at ∼400 K. We verified that higher than ∼700 K not only thermal fluctuations but also off-stoichiometry chemical disorder are taking place partially reducing long-range order. Strong overlapping, merging, and internal mode band smearing, suggest tripling in an idealized high temperature paraelectric cubic phase. X-ray absorption near edge structure (XANES) shows $Fe^{3+}$ turning into $Fe^{2+}$ while the Bi edge downshift suggests reduction under heating in a very complex configuration. Overall, our structural measurements reveal defect induced irreversible lattice changes in an environment lacking of long-range coherence. By contrast, far infrared wavelengths above Tc ∼1090 K do not show this local symmetry breaking only yielding three very broad bands as it would be, in a macroscopic view, if the cubic phase Pmcm (Z=1) is adopted. We do not detect an insulator to metal transition before melting

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