

Abstract Submitted
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Phonon Vibrations and Superconductivity of a Bi-based Superconductor JOOSEOP LEE, University of Virginia, MATTHEW STONE, Oak Ridge National Laboratory, TANER YILDRIM, NIST Center for Neutron Research, ASHFIA HUQ, GEORG EHLERS, Oak Ridge National Laboratory, YOSHIKAZU MIZUGUCHI, Tokyo Metropolitan University, SEUNGHUN LEE, University of Virginia, UNIVERSITY OF VIRGINIA TEAM, OAK RIDGE NATIONAL LABORATORY TEAM, NIST CENTER FOR NEUTRON RESEARCH TEAM, TOKYO METROPOLITAN UNIVERSITY TEAM — Elastic and Inelastic neutron scattering experiments have been carried out on polycrystalline samples of the newly discovered layered superconductor $\text{LaO}_{0.5}\text{F}_{0.5}\text{BiS}_2$, and its nonsuperconducting parent compound LaOBiS_2 to determine their crystal structures and lattice vibrational modes. The Bragg peaks from the superconducting sample shows large broadening in width in the powder diffraction pattern. For the lattice vibrations, significant difference was observed upon F doping. Using the density functional perturbation theory, we identified all phonon modes, and show the major change in the phonon spectrum comes mainly from the change in the Oxygen mode. Even though strong electron phonon coupling constant was estimated, no significant difference in the phonon spectrum from BiS_2 superconducting layer was found above and below T_c .

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