

**Lattice Vibrational Properties of $Ba_{1-x}K_xBiO_3$
In Its Superconducting And Non Superconducting Phases**

Sankar P Sanyal

Materials Research Laboratory, Department of Physics
University of Bhopal, Bhopal 462 026, India

During last one decade, the high temperature cuprate superconductors have drawn considerable attention, both from basic and applied research points of views. In the unconventional Cuprates, the role of phonons is yet to be understood in superconducting phase transition. However, in the other well known superconductor, BKBO no rigorous attempt has so far been made to investigate their phonon and related properties. In the present paper, we report a systematic study of vibrational properties of BKBO in its three phases, viz monoclinic ($x=0$), orthorhombic ($x=0.2$) and cubic ($x=0.4$) phase.. We have used, for this purpose, unscreened rigid ion model in which the ionic charge and radii of the ions are used as parameters and no fitting to the measured phonon spectrum is attempted. Our calculated results on phonon structure in the cubic superconducting phase ($x=0.4$), agree reasonably well with the neutron scattering results. The density of states, specially at higher energy due to oxygen vibrations for all the three structures agree well with the measured neutron data. We also report an excellent comparison of our calculated results on low temperature specific heat with the experiment in the superconducting phase of BKBO.