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Raman Spectroscopy of the Thermoelectric $\text{Sr}_{0.61}\text{Ba}_{0.39}\text{Nb}_2\text{O}_6$

MICHAEL PRIMROSE, JEAN TOULOUSE, Physics Department, Lehigh University, JONATHAN BOCK, CLIVE RANDALL, Center for Dielectric Studies, Materials Research Institute, Pennsylvania State University — Strontium Barium Niobate (SBN) has recently been shown by Lee et al. [1] to exhibit high thermoelectric power factors at temperatures above 500 K when it has been highly reduced. To determine the effects of reduction on the phonons, the Raman spectra of *unreduced* and *reduced* SBN have been measured at room temperature along the axis of polarization (*c*-axis) and perpendicular to it (*a*-axis). The Raman features of the *unreduced* crystal are found to be very broad and overlapping. In particular, a strong Lorentzian central (quasi-elastic) peak extending out to 400cm^{-1} is observed for light polarized along the *a* axis. By contrast and unexpectedly in the *reduced* crystal, thought to be more disordered, well resolved Raman peaks are observed, particularly at low frequencies. Also in the *reduced* crystal, the central peak is much suppressed and narrower, but a new peak appears at 1000cm^{-1} for both *c* and *a* polarizations. In addition, the high frequency peaks ($>200\text{ cm}^{-1}$) appear to broaden and to shift toward higher frequencies. High temperatures results may be available at the time of the conference.

[1] S. Lee, J.A. Block, S. Trolier-McKinstry and C. Randall, J. Europ. Ceram. Soc. v.32, p.3971 (2012)

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