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Inelastic Neutron Study of Phonon Lifetime Effects in Thermoelectric $Bi_2(Se,Te)_3$ Alloys[1] DILLON GARDNER, Massachusetts Institute of Technology, OLIVIER DELAIRE, MARK LUMSDEN, TAO HONG, Oak Ridge National Laboratory, DOYLE TEMPLE, Norfolk State University, YOUNG LEE, Massachusetts Institute of Technology — One important avenue of optimizing the thermoelectric figure of merit, ZT, is to reduce the thermal conductivity of phonons while preserving the electrical conductivity. Mass disorder caused by alloying provides an avenue of enhancing phonon scattering. In this work, the phonon spectra of different alloys of $Bi_2(Se,Te)_3$ are measured using inelastic neutron measurements. The temperature and composition dependence provide information on phonon softening and enhanced phonon scattering of acoustic phonon modes. Measurements on single crystals also reveal the dependence on the polarization of the modes. An additional low energy dispersing mode has been observed.

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