

## Isotopic Effect on Phonon Lifetime of Semiconductors

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The width of a Raman peak is an important parameter of solid state physics since it is proportional to the inverse of the phonon lifetime. The line-width contains the information about the mechanism by which an optical phonon at the center of the Brillouin zone can decay into phonons of different frequencies through the anharmonic coupling. In a recent study (see Ref. [1]) the phonon lifetime was calculated by means of density functional perturbation theory. In our work we investigate how different isotopic compositions modify phonon decay and how these processes can affect the shape of a Raman line. The asymmetric broadening measured in Raman spectra can be explained in terms of microscopic quantities. The scattering processes responsible for the line-width are computed within the plane-wave pseudopotential method in the framework of density functional theory [2].

[1] A. Debernardi, Phys. Rev. B **57**, 12847 (1998).

[2] A. Debernardi, Solid State Commun. **113**, 1 (2000).