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**Isotope dependence of band gap in semiconductors** TAKASHI KORETSUNE, SUSUMU SAITO, Tokyo Institute of Technology — Recently, carrier confinement was observed in diamond superlattice consisting of pure  $^{12}\text{C}$  and  $^{13}\text{C}$  layers. This interesting phenomenon comes from large isotope dependence of fundamental gap width in diamond. To understand this carrier confinement and design related nanodevices, we investigate the effect of electron-phonon couplings on quasi-particle energies in semiconductors composed of carbon and other light elements using first-principles methods based on the density functional theory. The calculated isotope dependence as well as temperature dependence of band gap in diamond is found to agree well with the experiment. We also discuss the isotope dependence in binary compounds such as boron nitride and silicon carbide.

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