Elastic Constants of II-IV Semiconductors.

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Streszczenie

The adiabatic elastic constants of the II-IV semiconducting compounds Mg2X (X=Si,Ge,Sn,Pb) are calculated using an angular-force model. Coulombic and repulsive forces are also included to first order. The only experimental parameters required for this calculation are the bulk modulus and the long-wavelength optical-phonon frequencies which are now available from first-order ordinary and resonant Raman scattering, neutron scattering, and infrared absorption measurements. Good agreement is obtained with the experimental values of the elastic constants and also for the Szigeti effective charge. From these and similar results on fluorite-type materials, it follows that the model, previously employed by other workers for the single case of Mg2Sn, is more appropriate for crystals with more pronounced covalent character.

Adres publiczny

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