

## **Anharmonicity effects in the phonon spectrum of crystals with hexagonal close-packed lattice**

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Expressions for the renormalized force constants of a crystal due to the effects of anharmonicity have been obtained in the self-consistent harmonic approximation.

The matrix of force constants have been calculated with taking into account contributions both central and non-central forces of interaction between atoms. The central forces of interaction have been described by Lennard-Jones potentials.

The calculation of phonon spectrum for symmetric directions of wave vector in the Brillouin zone for metals with hexagonal close-packed lattice have been performed.

The effects of anharmonicity and the contributions of non-central forces of interaction between the atoms of crystalline lattice in vibrational spectrum of hcp-*Ti* have been researched.

The frequencies of atomic vibrations of crystalline lattice and potential barriers for diffusion activation were found to diminish due to the effects of anharmonicity.

It was shown that with decreasing of ratio between the periods of crystalline lattice of  $c/a$  ( $c/a < 1,633$ ) the anisotropy of dependence of frequencies of vibrations from a wave vector is increasing.