FEATURES OF ULTRASOUND ABSORPTION BY DISLOCATIONS IN SUBGRAIN-FREE $Cd_{0.2}Hg_{0.8}Te$ CRYSTALS

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S u m m a r y

The temperature dependence of the ultrasound wave absorption in bulk p-$Cd_{0.2}Hg_{0.8}Te$ crystals free from low-angle grain boundaries has been studied experimentally for the first time in the frequency range 10–55 MHz and the temperature interval 150–300 K, and the corresponding results of measurements are presented. The maximum value of absorption coefficient is found to increase and to shift toward higher temperatures, as the ultrasound frequency grows. The results obtained can be satisfactorily explained in the framework of the Brailsford model, which associates the ultrasound absorption with vibrations of thermally activated dislocation kinks. The characteristic parameters of this model for p-$Cd_{0.2}Hg_{0.8}Te$ are determined; namely, the frequency coefficient $f_k \approx 6 \times 10^9$ Hz and the kink diffusion activation energy $W_k \approx 0.11$ eV. The dislocation concentration is also evaluated ($\alpha \approx 2 \times 10^{10}\,\mathrm{m}^{-2}$), with the determined value being consistent with that obtained by the selective etching method ($0.7 \times 10^{10}\,\mathrm{m}^{-2}$).