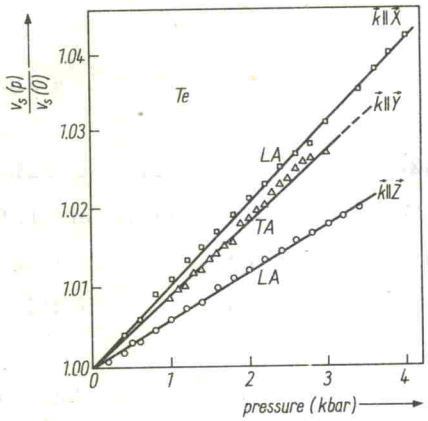

Fig. 2. Pressure dependence of the sound velocity

In their case a pressure of 3 kbar leads to an increase of v_s by about 3% corresponding to pressure coefficients of 10^{-5} bar^{-1} and 9×10^{-6} bar^{-1}, respectively. These values are relatively large as compared to other solids and indicate a pronounced anharmonicity of the lattice potential perpendicular to the Z axis. However, these coefficients are by far too small to account for the weak pressure dependence of the critical field.

This behaviour cannot be explained by a pressure dependence of the value of the attenuation constant α of the sound waves. Saturation takes place when α becomes negative because then the acoustic wave gains energy from the current carriers. The critical field where this effect sets in, is defined by $\alpha = 0$, which occurs when the drift parameter $\gamma = 1 - \mu E_c/v_s$ vanishes. That condition leads to equation (1). The observed discrepancy indicates that off-axis modes are important for the acoustoelectric effects in Te not only for $\vec{j} \parallel \vec{Z}$ but also for $\vec{j} \parallel \vec{X}$. In case of interaction with off-axis modes the orientation of the k vector of the sound wave with respect to the direction of the drift field becomes an important parameter which enters relation (1) (see reference (5)). If by pressure the contribution of these modes is diminished, the pressure dependence of the critical field will be less than expected from the pressure dependence of the mobility.

It is interesting that in trigonal selenium a quite similar behaviour has been observed (6). In this case from the absence of any pressure dependence of the critical field with $\vec{j} \parallel \vec{Z}$, it was concluded that the hole mobility was independent of pressure although the conductivity increased strongly. As has been demonstrated here, such a conclusion is not justified. In Se like in extrinsic Te the pressure dependence of the conductivity is supposed to originate mainly from an increase of the hole mobility.

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