2. Keldysh and Tratas [6] showed that the compensation of an n-type semiconductor results in the breakup of the exchange bonds between donor electrons by the electric fields of charged impurity atoms. A relative increase in the amplitude of the hyperfine splitting lines was observed experimentally in [7, 8] for n-type compensated silicon. This indicated that localized states were formed.

An analysis of the dependence of the magnitude of the hyperfine splitting of the EPR lines of phosphorus in silicon ($N_D = 7 \cdot 10^{17}$ cm^{-3}, K = 99%) on the uniaxial compression can give some information on the interaction of impurities in silicon.

Figure 2 shows the dependence of the relative splitting A/A_0 on the uniaxial compression applied to three samples with phosphorus concentrations of $N_D = 3 \cdot 10^{16}$, $5 \cdot 10^{17}$, and $7 \cdot 10^{17}$ cm^{-3} (K = 99%). It is evident from Fig. 2 that the experimental points fit the curve for the uncompensated silicon. This indicates that localized states are formed in the heavily doped and compensated silicon.

No theoretical expression is yet available for the influence of the electric fields of charged donors and acceptors on neutral impurities in a semiconductor subjected to uniaxial compression. However, the experimental results (Fig. 1) indicate that the curve for a compensated sample is identical with the curve for a lightly doped crystal, and is shifted from the latter by 4 Oe, which is equal to the difference between the values of the hyperfine splitting at zero pressure. Hence, we may conclude that, in the investigated range of uniaxial compression (up to 30 kgf/mm^2), the two causes of the reduction in the hyperfine splitting (uniaxial compression and the Stark effect) are independent.

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