



FIG. 6. Diagram of the effect of a 2% hydrostatic compression and a 2% one-dimensional [111] compression on critical points in the band structure. Values shown are calculated from the analysis of GOROFF and KLEINMAN.⁽³⁾

band maximum from the calculated energy gap change obtained from our experimental results. This computation suggests that the effective valence band maximum is essentially stationary in energy as if splitting of the valence band edge results in a new distribution of holes among the closely spaced valence band energy levels whose behavior approximates the original unstrained behavior. However, the physical significance of this observation is not clear, since data describing the populations of the various valence band energy levels, hole mobilities and effective masses for Ge in [111] one-dimensional strain are necessary to provide data for a more complete analysis. The large change in the effective mass of holes for Si under uniaxial stress⁽³²⁾ suggests that significant changes are to be expected.

The source of the finite time to establish equilibrium resistivity is not apparent from previously measured relaxation times of carriers. Intervalley relaxation times have been measured by high frequency ultrasonic absorption of shear waves⁽³³⁾ and are about 10^{-11} sec at room temperature and for low carrier densities. Similarly, the relaxation time for the repopulation of holes is of the same order of magnitude or shorter. Thus, the observed resistivity relaxation is most likely due to impurity scattering or generation-recombination times.

In summary, the resistivity measurements in elastic one-dimensional strain provide a measure of an effective coefficient of energy gap change with [111] one-dimensional strain if atmospheric pressure values for mobilities and effective masses are assumed for the strained crystal. The coefficient determined gives a shear strain contribution which agrees to 60% with the theoretically predicted value for Si. However, further experiments in one-dimensional strain are required for a more complete physical description of the conduction process. Our results indicate that shock waves in the elastic region provide a convenient deformation for the study of the change in the band gap of Ge by shear strain.

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THE EFFECT OF TEMPERATURE ON THE RATE OF REACTION



Graph showing the effect of temperature on the rate of reaction. The rate of reaction increases with temperature for both the forward and reverse reactions, but the forward reaction rate increases more rapidly.

The rate of reaction is affected by temperature. As the temperature increases, the rate of reaction increases. This is because the molecules have more energy and are able to overcome the activation energy barrier more easily. The rate of reaction is also affected by the concentration of the reactants. As the concentration of the reactants increases, the rate of reaction increases. This is because there are more molecules available to react.

The rate of reaction is also affected by the presence of a catalyst. A catalyst is a substance that speeds up the rate of reaction without being consumed in the reaction. Catalysts work by providing an alternative pathway for the reaction with a lower activation energy.

The rate of reaction is also affected by the surface area of the reactants. As the surface area of the reactants increases, the rate of reaction increases. This is because there are more molecules available to react. The rate of reaction is also affected by the pressure of the reactants. As the pressure of the reactants increases, the rate of reaction increases. This is because there are more molecules available to react.

The rate of reaction is also affected by the nature of the reactants. Some reactants react more readily than others. The rate of reaction is also affected by the nature of the products. Some products are more stable than others.

The rate of reaction is also affected by the concentration of the products. As the concentration of the products increases, the rate of reaction decreases. This is because there are fewer molecules available to react. The rate of reaction is also affected by the concentration of the catalyst. As the concentration of the catalyst increases, the rate of reaction increases.