

SURFACE MOBILITY OF ELECTRONS IN CATHODICALLY  
TREATED N-TYPE GERMANIUM

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In this work we have used an electrolytic treatment as a means of influencing surface scattering in germanium. It is well known <sup>1,2)</sup> that hydrogen evolution at germanium cathode results in a marked increase of surface recombination velocity. This was attributed to penetration of electrolytically discharged hydrogen atoms into the germanium lattice so as to form surface states acting as recombination centers. Our aim has been to study the influence of these surface centers on surface mobility of carriers.

Specimens have been prepared from single crystal slices of near intrinsic n-type germanium. Following the standard procedure of preparation they were chemically etched in CP-4A solution and mounted in a metal cryostat. Measurements were made of conductivity and Hall effect changes produced by the field effect in the range of temperatures between 112 and 203 K. Subsequently, these specimens were cathodically treated in 0,1N aqueous solution of HCl and again mounted in the cryostat. The same series of measurements were performed at the same fixed temperatures. From conductivity and Hall effect data, using procedure suggested by Petritz <sup>3)</sup> and employed by Rzhanov <sup>4)</sup> surface Hall mobilities of electrons in accumulation layers have been extracted as a function of barrier height. These data have been plotted as a function of temperature for several fixed values of barrier

the dependence can be understood in term of previous measurement, since different part of the film give different

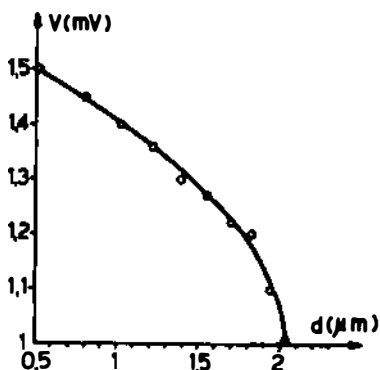


Fig.2  $V_{ph}$  v.s. mean thickness of the film section

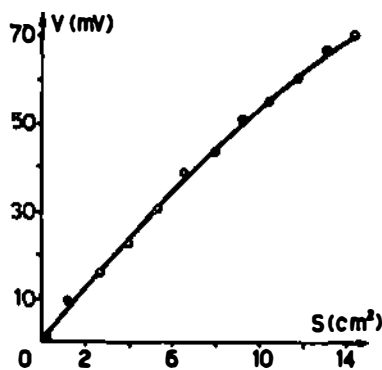


Fig.3  $V_{ph}$  v.s. the length of illuminated area of the film

contribution to the photovoltage. Since the last measurement was carried out from the thinner to thicker end the curve shows saturation.

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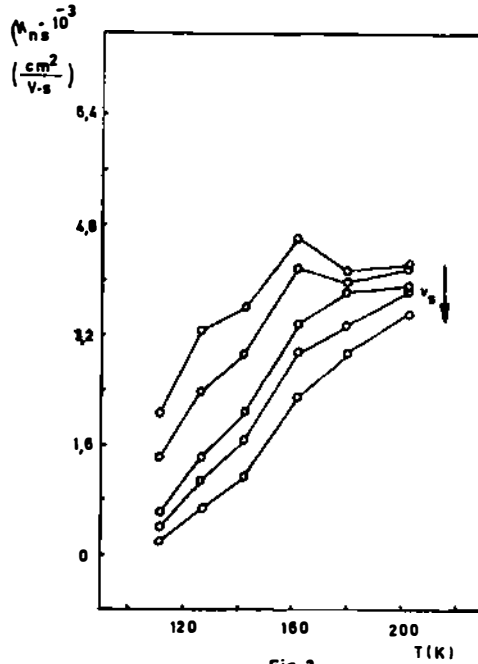


Fig. 2

Continuation of this work, we expect, will enable us to explain more fully these results in terms of corresponding surface scattering mechanisms.

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