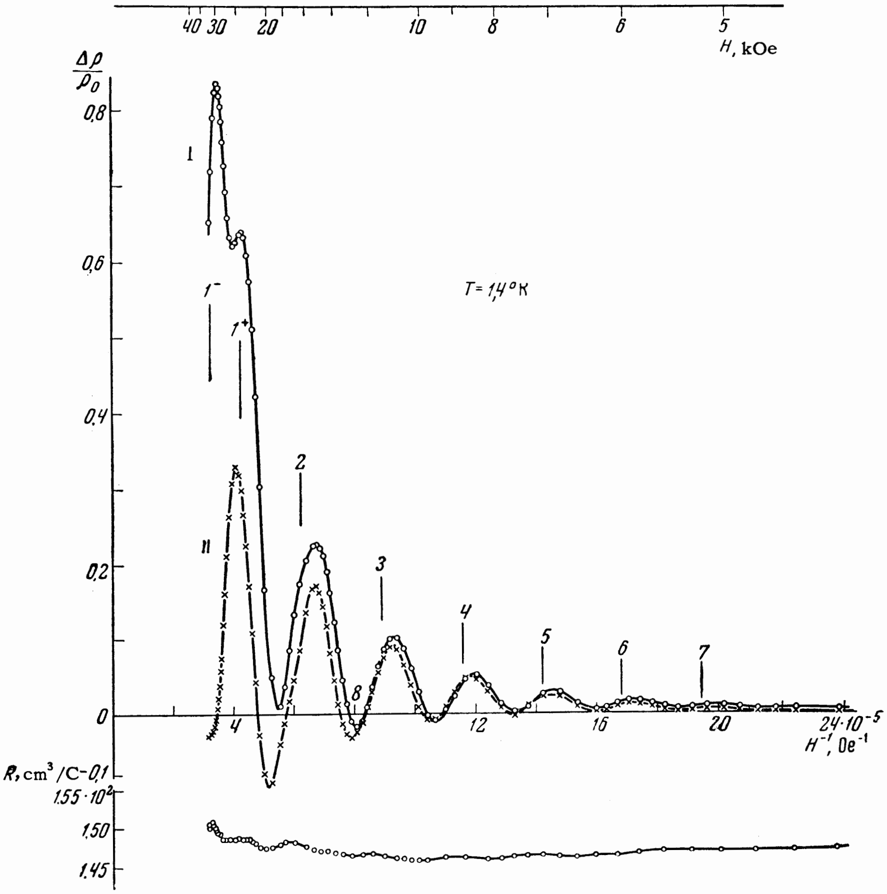

FIG. 2. Experimental curves of the dependence of the transverse ($\Delta\rho_{\perp}/\rho_0$) and longitudinal ($\Delta\rho_{\parallel}/\rho_0$) magnetoresistances of n-type InSb on the magnetic field intensity at T = 1.4°K. The lower curve shows the Hall coefficient. The vertical lines with the indices 1^-, 1^+, 2, ... , have the same meaning as in Fig. 1.

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Translated by A. Tybulewicz

MAXIMUM IN THE MELTING CURVE OF ANTIMONY

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THE phase diagram of antimony was investigated in[1,2]. In these investigations, which did not agree fully with each other, a monotonic reduction of the melting point of antimony was found right up to pressures of 57 kbar.[2] Vereshchagin and Kabalkina[3] carried out an x-ray diffraction study of antimony at high pressures. They discovered two new crystalline modifications of antimony: Sb II - with a simple cubic structure, and Sb III - with a close-packed hexagonal structure. The pressures at which the transitions occurred at room temperature were: Sb I → Sb II - 70 kbar, Sb II → Sb III - 85 kbar.

The Sb II—Sb III transition is in agreement with the transition discovered in antimony by Bridgman[4] from a jump in volume at 83.3 kbar, and with the triple point reported by Klement et al.[2] Since the Sb I—Sb II transition was not discovered in[1,2], it seemed interesting to carry out a more thorough study of the phase diagram of antimony by a thermal analysis method. The description of the experimental method will be published later. The accuracy of the pressure measurements was ± 75 kg/cm^2. The reproducibility of the thermocouple readings in one experiment amounted to 0.15 deg C. The scatter of the data from different tests did not exceed 0.5 deg C. It is evident from Fig. 1 that the melting point of antimony (our sample of which was 99.999% pure) is depressed by pressure to a point with the coordinates: $P = 3900$ kg/cm^2, $T = 627.8$°C. Above this pressure, the melting curve rises and reaches a maximum at the point $P = 6700$ kg/cm^2, $T = 628.6$°C, and then it again begins to drop.

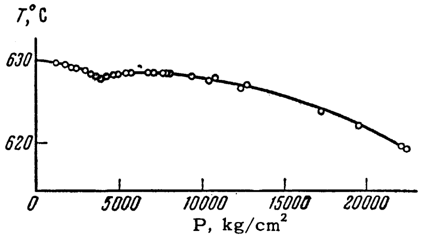

FIG. 1. Melting curve of antimony up to 20 000 kg/cm^2.

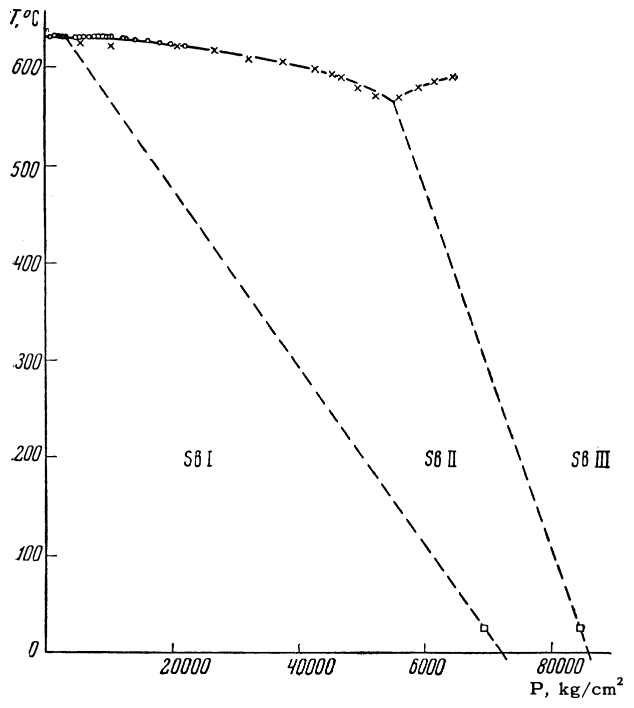

FIG. 2. Unified phase diagram of antimony: ● – data of the present study; × – data of Klement et al.[2]; ■ – data of Vereshchagin and Kabalkina.[3]

In the region above 10 000 kg/cm^2, our data agreed, in general, with the data of Klement et al. The minimum at $P = 3900$ kg/cm^2, $T = 627.8$°C, was obviously the triple point but we were unable to observe the thermal effects associated with the solid-state transformation anywhere in the range of investigated pressures. Most probably, the thermal effect of this transformation is very small. We assumed that the observed triple point was the point of intersection of the melting curve with the Sb I—Sb II equilibrium curve.[3] Vereshchagin and Kabalkina assumed that the Sb I—Sb II transition is a second-order phase transition, but the properties of the melting curve of antimony in the region of the triple point indicated quite definitely a phase transition with a finite change in volume. In our opinion, this contradiction is not serious, since the change in volume should be very small and may not have been noticed. Figure 2 shows the unified phase diagram of antimony. It is seen that this phase diagram is another example of diagrams with a maximum in the melting curve.

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STIMULATED RAMAN SCATTERING IN THE ANTI-STOKES REGION

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THE present paper deals with the explanation of the mechanism of the appearance and of the properties of the anti-Stokes component in stimulated Raman scattering (SRS). The conditions under which this scattering may appear have been