becomes the same as for narrow-band pumping. In the opposing variant, there is no gain at all in the entire region of investigated intensities ($g_{br} \approx 0$). This fact has not yet been theoretically explained.

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2.5 MEGABAR PRESSURE IN ANVILS MADE OF CARBONADO TYPE DIAMOND

L.F. Vereshchagin, E.N. Yakovlev, G.N. Stepanov, K.Kh. Bibaev, and B.V. Vinogradov
Institute of High Pressure Physics
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In his 1941 paper on the limit of usable pressures [1], Bridgman cites data on pressures obtained between a truncated cone and a plane made of a hard alloy (carboloy 905).

Since 1941, the properties of hard materials based on tungsten carbide (carboloy, VK alloys), have been continuously improved, but no substantial progress was made in such experiments.

In the cited paper, Bridgman [1] expressed the opinion that much higher contact pressures might be obtained by using a material consisting of microscopic diamond grains firmly bonded to one another. Natural diamond fine-grain aggregates, in Bridgeman's opinion, do not satisfy these requirements because of their porous structure.

In 1969, we reported the synthesis of diamonds of the carbonado type [2]. Carbonado is a polycrystalline formation made up of microscopic diamond grains that are firmly bonded with one another.

We prepared a cone and a plane of carbonado. The cone had a vertex angle 168° and the vertex was somewhat flattened. The diamond plane and cone were placed in a steel mount.

The average contact pressure P was calculated from the formula

$$P = \frac{F}{S}$$

where F is the applied force and S the area on which the force was applied.

The force was measured with a calibrated dynamometer. The area on which the force F was concentrated was determined from the print produced on a film deposited on the surface of the diamond plane.

Plane №	Cone №	Force F, kg	Area $S \cdot 10^6$, cm^2	$P \cdot 10^{-6}$, kg/cm^2
22	26	30 ± 1	20.6 ± 1.0	1.5 ± 0.1
18	26	30 ± 1	12.1 ± 1.0	2.5 ± 0.2
23	26	30 ± 1	21.3 ± 1.0	1.4 ± 0.1
21	26	30 ± 1	25.8 ± 1.0	1.2 ± 0.1

The table lists the data on the pressures developed in the contact between the plane and conical diamond anvils.

It can be stated on the basis of the results that we have obtained a material suitable for the production of a high-pressure chamber in which pressures up to 2.5 - 3 megabar can be obtained in a volume sufficient for physical tests.

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THERMAL CONDUCTIVITY OF ALUMINUM IN STRONG MAGNETIC FIELDS AT LOW TEMPERATURES

N.N. Sirota, V.I. Gostishchev, and A.A. Drozd
Institute of Solid State Physics and Semiconductors, Belorussian Academy of Sciences
Submitted 14 July 1972
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The investigation of the thermal conductivity of metals in strong magnetic fields at low temperatures is of interest in connection with the possibility of analyzing the electronic energy spectrum and separating the electronic and lattice components of the thermal conductivity [1, 2].

The present paper is devoted to a study of the thermal conductivity of pure aluminum in the region of low temperatures, 6 - 57°K, in transverse magnetic fields of intensity up to 50 kOe.

The object of our investigation was an aluminum single crystal cut from an ingot, with a resistivity 1.2×10^{-10} ohm-cm at helium temperature. After the sample was prepared and mounted in the chamber, the ratio R(273°K)/R(4.2°K) was of the order of 6000. The sample measured 3 × 4 × 60 mm, and its long axis coincided with the crystallographic [110] direction. The sample was oriented by x-ray diffraction using the Laue pattern.

The thermal conductivity was measured by the method of stationary heat flow. The temperature difference along the sample was produced by two electric heaters mounted on its end. This difference over the length of the measured part (∿30 mm) ranged as a rule from 0.2 to 1.2°K. The temperature was measured with Allen Bradley resistance thermometers. The sample in the calorimeter was enclosed in a radiation shield to prevent heat loss by radiation and through the connecting leads. To this end, a temperature gradient close to the temperature distribution on the sample was produced in the shield. In the two sections passing through the thermometers, the temperatures of the sample and the screen were maintained equal and monitored with Cu-AuFe differential thermocouples. All the connecting leads to the sample were placed only at these sections.