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ARTIFICIAL FORMATION OF BALLAS-TYPE DIAMOND

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Abstract**Full Text**

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*PHYSICS***Ya. A. KALASHNIKOV, Academician L. F. VERESHCHAGIN,
E. M. FEKLICHEV, I. S. SUKHUSHINA****ARTIFICIAL FORMATION OF BALLAS-
TYPE DIAMOND**

A number of works are currently devoted to the production of artificial diamonds (1-5), in which various methods for diamond synthesis are described. In many countries the synthesis of artificial diamonds has been successfully carried out on an industrial scale; therefore, the conditions for the formation of artificial diamonds are known in general detail. Diamonds of diverse physicochemical properties have been obtained (6). However, in none of these works were large polycrystalline specimens of artificial diamonds synthesized, nor has anyone succeeded in synthesizing ballas—a rare form of natural diamonds.

The diamonds obtained by us are spherical complex formations about 6-6.5 mm in size (Fig. 1).

Measurements were made of the density of the polycrystalline specimens obtained. It turned out that in the central region the density of the diamonds is higher than the normal density of natural diamond. In all probability, this may be explained by the inclusion of atoms of the metal catalyst in the diamond lattice. Toward the edge of the specimen the density of the diamonds decreases somewhat and reaches the tabulated value.

The surface of the diamonds obtained consists of small, fairly well-defined crystals (Fig. 2).

The crystalline structure of the inner part of the specimens is quite distinctly expressed and makes it possible to assign them to the carbonado type. The surface, on which a complex network consisting of triangles is visible (see Figs. 1 and 3), as well as comparison of the obtained artificial diamonds with forms existing in nature (7), makes it possible to assert with a certain degree of reliability that the synthesized form is extremely close to the ballas-type diamond encountered in nature.

In conclusion, the authors express their gratitude to Yu. L. Orlov for taking part in the discussion of the results obtained, and also to M. I. Kormilkin for assistance in setting up the experiment.

Fig. 1

Figure 1: Fig. 1

Fig. 2

Figure 2: Fig. 2

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Fig. 1. Synthesized ballas in the form of an almost ideal sphere, 6.5 mm in diameter

Fig. 2. Emergence of octahedral planes of diamond on the surface of ballas, 60×

Fig. 3. View of an octahedral plane of diamond, 180×

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Note: Figure translations are in progress. See original paper for figures.

Fig. 3

Figure 3: Fig. 3

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