

Thermophysical properties of the molten diamond in extreme conditions of the planetary interior

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Previously a free energy of liquid diamond has been constructed within the limits of the semi empirical approach and a maximum on a melting curve of diamond in a point (400 GPa; 5700 K) has been received [1]. The conclusion has been made - the melting curve of diamond gets a negative derivative $dT/dP < 0$ in the pressure region exceeding 400 GPa. Moreover in this work the Hugoniot of diamond is calculated. It tests a kink in the region where the slope of a melting curve has negative value. At that a kink and the prognostic Hugoniot of the molten diamond have appeared close to experimental points from work of foreign scientists.

It was supposed [1], that molten diamond represents a dielectric. However it is shown [3], that liquid diamond well reflects light behind of shock wave front. It is interpreted as consequence of metallization of the molten diamond. Besides recently the measurements of temperature of strong shock compressed molten diamond have appeared.

In the stated work it is shown, that a metal state of a liquid diamond in conditions of planetary interior of the Uranium and the Neptune (pressure ≈ 1350 ГПа, temperature ≈ 11500), can be interpreted qualitatively and quantitatively within the limits of semi empirical definition in approach almost free electrons approach from [4] and lattice component from [1].

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