

# INVESTIGATIONS OF LIQUID CARBON AT PRESSURES ABOVE 200 BAR

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The properties of liquid carbon, such as density and electrical conductivity at pressures near the triple point, are poorly investigated. Analyzing the literature data [1], [2], it can be concluded that carbon in the liquid phase has dielectric properties, but at high pressures it conducts the current. Investigations of this transition are not presented in the literature. Thus, it is not difficult to come to the conclusion that the study of the liquid carbon properties at pressures from a triple point to several kilobars can be carried out only with the use of laser heating. In this work we use the method of laser heating of graphite in a chamber with a high pressure of He such as in [3]. The results of experiments on the melting of carbon using laser heating technique in an at pressures up to 6000 bar are presented in this work. The sample is isotropic graphite of the EC-02 mark. The drops and cross sections of crystallized liquid carbon were analyzed by scanning electron microscopy. Part of the cross sections of the samples with the melt zone was obtained by the ion-cutting method. The fraction of pores in the cross sections through the melt zone was studied, which, assuming rapid solidification of the liquid at a cooling rate of 1 MK / s, gives an estimate for the density of liquid carbon. The dependence of the density of liquid carbon on pressure up to 6 kbar was obtained using this data.

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1. F. P. Bundy Melting of Graphite at Very High Pressure The Journal of Chemical Physics 38, 618 (1963);
  2. G. R. Gathers, J. W. Shaner, D. A. Young. High temperature carbon equation of state UCBI-51644 September 4, 1974
  3. M. Musella, C. Ronchi, M. Brykin and M. Sheindlin. The molten state of graphite: An experimental study. //J. of Applied Physics, 84, No.5 (1998), p.2530-2537.