

# OBSERVATION OF GRAPHITE MELTING DURING LASER HEATING IN VACUUM

*Vasin A.A.,\* Frolov A.M., Sheindlin M.A.*

*JIHT RAS, Moscow, Russia*

*\*av65536@gmail.com*

Experimental results on graphite melting are still very discrepant. For example, the heating using direct current transmission to study graphite melting near the triple point turned out to be impossible due to the low electroconductivity of liquid carbon. Laser melting [1] of the graphite at high pressure allowed to define the parameters of the carbon triple point: pressure of about 110 bar, temperature - 4800 K. In the present work it is reported that the formation of liquid carbon was observed for the first time on the surface of pyrographite heated in vacuum with a laser beam with the power up to  $10^6$  W/cm<sup>2</sup>. Heating of the sample surface was performed applying the laser pulses of millisecond duration with increasing speed of power ascending, and that made it possible to reach the melting conditions, despite vacuum maintained in the chamber. The surface temperature was measured using a brightness pyrometer at the wavelength of 900 nm. The beginning of melting was registered through abrupt increasing of laser irradiation reflection from the samples surface. The measured melting temperature was about  $4650 \pm 50$  K.

- 
1. Musella M., Ronchi C., Brykin M., Sheindlin M. The molten state of graphite: an experimental study. *J. Appl. Phys.* 1998. 84. p. 2530