Experimental study of thermophysical properties of refractory metals at extremely high temperatures in the region of strongly non-ideal degenerate plasma

Gavrilev A. Ch.[1,@], **Senchenko V. N.**[1] **and Melnikov S. A.**[1]

[1] Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg˜2, Moscow, 125412, Russia

[@] gavrilev.ach@phystech.su

A metal in the liquid state can be considered, to a first approximation, a strongly non-ideal degenerate plasma. However, the thermophysical properties of refractory transition metals (Hf, V) in the high-temperature region remain poorly studied. In this context, experimental data on the heating of these metals were obtained using the microsecond resistive heating method. Owing to its high heating rate of more than 10^8 K/s, this method enables studies of metal properties in the liquid phase at high temperatures. The time-dependent current, voltage, thermal expansion (measured by shadow photography), and brightness temperature at two wavelengths (862 and 650 nm) were processed to derive the following thermophysical properties as functions of temperature: specific enthalpy, specific heat capacity, electrical resistivity, and density. The results obtained agree well with published data.