Saturation of electrical resistivity in vanadium at high shock pressures

Molodets A.M.[1,@], **Golyshev A.A.**[1] **and Kim V.V.**[1]

[1] Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry of the Russian Academy of Sciences, Academician Semenov Avenue 1, Chernogolovka, 142432, Russia

[@] molodets@icp.ac.ru

Experimental and computational results of a study of the volume-temperature dependence of the electrical resistivity of vanadium at high pressures and elevated temperatures are presented. The experimental part of the work contains measurements of the electrical resistance of shock-compressed vanadium samples under stepwise cyclic shock compression in the pressure range up to 70 GPa and temperatures up to 750 K. Calculations of the history of the thermodynamic state of shock-compressible vanadium have been carried out. It is shown that the saturation effect of the electrical resistivity of vanadium, which occurs at atmospheric pressure, persists at gigapascal pressures. A semi-empirical interpretation of the regularities of the volume-temperature dependence of the electrical resistivity of vanadium is formulated, which makes it possible to predict these properties up to pressures in the gigapascal range.