

POLYMORPHOUS TRANSITION AND ELECTROPHYSICAL PROPERTIES OF SHOCKED SCANDIUM

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In high pressure physics the unexpected trend in the row of polymorphous transitions of alkaline and alkaline earth metals has recently been discovered (see [1] and ref.). It has been discovered that in the pressures interval up to 200 GPa alkaline metals undergo the number of structural transitions. Moreover the appearing high-pressure phases are often less symmetrical and possess less compact packing than the phases realizing under the atmospheric pressure. These are such phases as e.g. having recently been discovered the high pressure incommensurate phase scandium Sc-II [2,3]. In the present paper the measurements of conductivity and the calculated thermodynamics properties of shock compressed incommensurate phase scandium Sc-II are presented. The shock compression was performed by the step shock wave up to the maximum amplitudes 90 GPa. The simultaneous registration of the pressure and the sample electric resistance was performed at its shock compression. The equation of state scandium Sc-I, as well as incommensurate phase Sc-II are constructed by the high pressure isotherms in the form [4]. For incommensurate phase Sc-II as well as for Sc-I the experimental isotherm from [2] with the correction [3] was used. The three areas are revealed on experimental Hugoniot: A domain - the mixture Sc-I and incommensurate phase Sc-II, B domain - the mixture incommensurate phase Sc-II and hypothetically Sc-III, C domain hypothetically Sc-III or melt. The shock pressure dependence of the electrical resistivity Sc is changed in the following way. In the A domain the electrical resistivity is increased. In the B domain the resistivity is changed weakly, in the C domain the decrease of electrical resistivity is observed.

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