DETERMINATION OF SHOCK COMPRESSION CONDITIONS FOR POROUS NiA^{L} SAMPLES BELOW THE MELTING CURVE

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Utilising an experimentally obtained melting line and the NiAl equation of state [1], the dependence of the threshold pressure for melting on the porosity of samples in shock- wave experiments has been established. This enables the implementation of shock-wave loading conditions that do not result in melting and which do not interfere with the observation of polymorphic transformations in NiAl. To this end, the NiAl melting line was determined under laser heating in diamond anvils in the pressure range up to 44 GPa. The temperature was measured using a multispectral camera [2]. The initiation of melting was identified by analysing the dynamics of speckles of reflected laser radiation [3]. The measured section of the melting line is convex downwards, which is atypical, and allows for the presence of polymorphic transformation in NiAl. An approximation of the experimental data is proposed, and the position of a hypothetical triple point on the T-P plane is determined. The results obtained allow further investigation of the presence of polymorphic transformations in NiAl in shock compression experiments and explain the reasons why these transformations have not been observed in experiments measuring the isotherm at room temperature in diamond anvils and during shock compression of solid samples.

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