Modeling of shock-wave processes in the W–Ni–Cu system at high pressures and temperatures

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Knowledge of the thermodynamic properties of materials is of interest for solving fundamental and applied problems of physics of extreme states of matter. This paper presents a model of the equation of state for the W–Ni–Cu system at high pressures and temperatures based on the thermal and caloric equations of state and mass fractions of the mixture components. An alloy of tungsten, nickel and copper combines the properties of these elements, resulting in a material that is strong, wear-resistant, ablation-resistant, with high thermal and electrical conductivity, easy to process, and has a high density. Due to its properties, W–Ni–Cu alloy is widely used in aerospace, aviation and other fields.

In the present work, several compositions of the W–Ni–Cu system are considered and comparisons are made with shock wave experiments. The results obtained are in good agreement with the experimental data.

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