Modeling of shock wave loading of calcium oxide

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The study of the behavior of oxides in particular calcium oxide under high pressures and temperatures is of great interest in various fields of condensed matter physics, including geophysics [1]. This research presents the results of modeling the shock wave loading of calcium oxide (CaO) up to pressures of 100 GPa, taking into account phase transitions. The sample is considered as a mixture of low-pressure and high-pressure phase's in the field of polymorphic phase transition. The model used for calculations assumes that the components of the material are in thermodynamic equilibrium during shock wave loading [2, 3]. An equation of state for the low-pressure phase B1 is obtained up to 50 GPa with an isothermal modulus of elasticity of $K_0 = 42.8$ GPa and its derivative in pressure 5.6. The equation of state for the high-pressure phase B2 is also obtained at pressures from 50 GPa and above, with parameters 389.9 GPa and 3, respectively. These results are verified using experimental data obtained from dynamic experiments and the calculations of other researchers.

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[2] Mayevskii K K 2022 *High Temp.* **60**(6) 768–774
[3] Maevskii K K 2024 *Combust., Expl., Shock Waves.* **60**(2) 260–268