# Model of the equation of state of rocks as a mixture of minerals at high pressures and temperatures

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This paper presents a model of the equation of state of a multi-component system as a mixture of individual substances in a wide range of pressures and temperatures [1]. The model assumes that thermodynamic equilibrium is achieved in the mixture - equality of pressures and temperatures of the components. Then, knowing the equations of state of the components and their mass fractions, the equation of state of the mixture is determined. The model is used to calculate the thermodynamic properties of minerals and rocks. For example, such rocks as forsterite ($Mg_2SiO_4$) and enstatite ($MgSiO_3$) are presented within the model as mixtures of silicon dioxide ($SiO_2$) and magnesium oxide (MgO) with different mass fractions of the components: 42.7–57.3% ($SiO_2$–MgO) for $Mg_2SiO_4$ and 59.9–40.1% for $MgSiO_3$.

The equations of state for the components of the studied mixtures are presented: $SiO_2$, MgO, $CaCO_3$, $H_2O$, etc. The shock adiabats for the components and mixtures are calculated using the proposed equations of state. The results of these calculations are compared with available experimental data on shock compression at high pressures and temperatures.

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