

Effects by porosity of a chondrule precursor in the shock wave heating model

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The shock wave heating model is paid much attention as a candidate for the chondrule formation model. In this model, a chondrule precursor is heated by gas drag after the passage of a shock wave. A possible precursor of a chondrule is a porous dust aggregate. It has been assumed the porosity of a precursor is zero in previous studies. However, porosity changes the cross section area on which the heat flux to the precursor depends. In this study, we numerically determined the evolution of the radius and temperature distribution of a porous precursor. It has been found that the peak temperature of a porous precursor is substantially lower than that of zero porosity. Evaporation of a precursor is avoided by this decrease in temperature for porous precursors. This result suggests that the velocity range of the shock wave preferable to the chondrule formation enlarges for porous precursors.