

High-pressure minerals in shock melt veins of L6 chondrites: constraints on their P-T history

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The accretion of the terrestrial planets from asteroid collisions and delivery of meteorites to the Earth has been studied extensively. Investigations of meteorites that experienced such shock events are useful for understanding of mechanism of planetary impact event and formation of terrestrial planets. The aim of this study is to investigate the mineralogy of shock-induced melt veins in two L6 chondrites (Sahara98222 and Yamato74445) and also to estimate the P-T conditions experienced by them in impact events.

We used optical microscope and Scanning Electron Microscope to observe texture of the samples. For phase identification, we used micro-Raman spectrometer. To examine chemical composition of minerals, we used electron probe micro analyzer.

We found that shock vein of Sahara98222 contains olivine, wadsleyite, enstatite, diopside, maskelynite, jadeite, merrillite, tuite and that of Yamato74445 contains olivine, wadsleyite, ringwoodite, enstatite, diopside.

From the observed phases and their phase diagrams obtained by high-pressure experiments, we estimated the experienced P-T conditions in these meteorites; Sahara98222:14-16GPa, 1900-2100 degrees C; Yamato74445:15-16GPa, respectively.