PARTIAL TRANSFORMED HIGH PRESSURE PHASES IN SHOCKED-INDUCED MELT VEIN OF ANTARCTIC GRV METEORITES. Zhidong Xie and Shuhao Zuo, School of Earth Sciences and Engineering, Nanjing University, P.R.China, zhidongx@nju.edu.cn

Introduction: Shock-induced melt vein in meteorite is a natural gift to understand phase transformation under extreme pressure and temperature, and provide valuable insight to the natural impact event in solar system and useful information about deep mantle mineralogy of the Earth [1-7]. High-pressure phases can be either crystallized from melt or solid-state transformed under shock, which can be used to constrain the shock pressure and duration [1-3]. Solid-state transformation of entrained host-fragments is more complex due to variable temperatures, which involving element diffusion and partial transformation of origin phases. This study will focus on the partial solid-state transformation of major minerals in chondrites. The goal of this study is to better elucidate the mechanisms of partial transformation and Mg-Fe diffusion in olivine, pyroxene, and plagioclase, and estimate the shock duration.

Various microanalysis methods, include Raman spectroscopy and electron microscopes (SEM, EMAP, and FIB-TEM), were used to investigate the microstructure and mineralogy of shock-induced melt veins in several Antarctic GRV chondrites. These samples are GRV 022321, GRV 022454, GRV 022115, GRV 022449, GRV 022120, GRV 022031, and GRV 022034. These chondrites all have a network of black veins which enclose abundant host-rock fragments with olivine or pyroxene or plagioclase as precursors under optical microscopy. Unique textures of entrained host-fragments were found in melt vein in these GRV chondrites in high-resolution BSE imaging. Preliminary result show abundant partial solid-stated transformation of olivine and pyroxene, and Fe-Mg diffusion. Raman spectra are obtained to identify the phases. Few interested points were selected to make TEM samples by FIB technique.

The occurrence of the rounded shape grains with smooth edges embedded in the fine matrix in shock-induced melt veins suggest that they are enclosed host-rock fragments, and transformed by solid-state transformation. Mix of high-pressure phases and low pressure phases in one single grain suggests partial solid-state transformation. Based on obtained data of mineralogy of melt veins, combining with knowledge of shock physics and static high-pressure experiments, using related mineral kinetics, crystallization and thermal conduction modeling, we can calculate the duration of element diffusion, crystal growth, and crystallization of melt veins, then estimate the shock duration [2, 4], and discuss the shock condition of parent body of planet embryo in early solar system. More discussion will be available in the meeting.

Références: [1] Xie, Z. et al. (2006) *GCA, 70.* 504-515. [2] Xie and Sharp (2007), *EPLS*, 433-445. [3] Langenhorst and Poirier (2000) *EPSL 184*, 37-55. [4] Ohtani et al. (2004) *EPSL 227(3-4),* 505-515. [5] Beck, et al. (2005) *Nature 435*, 1071-1074. [6] Ohtani et al. (2006), *Shock Waves*, 16:45-52. [7] Miyahara et al. (2008) *Proceedings. of NAS 105,*8542-8547..