High-pressure phases in shocked GRV chondrites: Partial solid-state transformation mechanism

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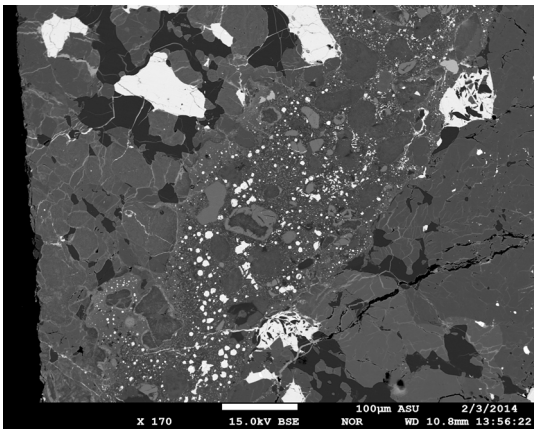
Introduction: Shock-induced melt vein in meteorite is a natural gift to understand phase transformation under extreme pressure and temperature, and provide valuable insight to the natural impact event in solar system. High-pressure phases can be either crystallized from melt or solid-state transformed 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. We use electron microscopes (SEM, EMAP, and TEM) to study unique GRV chondrites to better elucidate the mechanisms of transformation and Mg-Fe diffusion in olivine and pyroxene, and estimate the shock duration.



Results and Discussion: Unique textures of entrained host-fragments were found in melt vein in several GRV chondrites under high-resolution BSE imaging (see Fig above). Preliminary result show abundant partial solid-stated transformation of olivine and pyroxene, and Fe-Mg diffusion. Further results of Raman spectra may be obtained to identify the phases. More discussion will be available in the meeting.

[1] Xie, Z. *et al* (2006) *GCA, **70***. 504-515. [2] Ohtani *et al* (2006), *Shock Waves*, **16**:45-52. [3] Miyahara *et al* (2008) *Proceedings. of NAS **105***,8542-8547.