THE SHOCK EEFECTS OF GRANITIC IMPACTITE FROM ALETAI IRON METEORITE, XINJIANG, CHINA.

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Introduction: The longest meteorite strewn field was identified as Aletai iron meteorite in 2016 by Wang and Xu [1]. Akebulake, a member of Aletai iron meteorite rain with a mass of 18 t, was found in N48°6.25', E88°16.57' in 2011, which classification information is issued in Meteoritical Bulletin 105. During the recovery of Akebulake, some glassic rock fragments were found. These glassy rock samples have been confirmed as the impactite from Akebulake iron meteorite. Here we represent some preliminary work on shock effects of the impactite of Akebulake.

Geological Setting: The Akebulake iron meteorite locates on the top of a mountain in Kelan Canyon in Aletai Mountains, Xinjiang. It was surrounded by huge rocks and half buried. The site is in the granite region. The granite is mainly a kind of medium grain sized biotite granite. When we went and worked in the field, a piece of half-melted biotite granite is found only about 2 m away from the original location of Akebulake. Due to the close distribution of huge granite boulders, no outcrop of granite base rock could be found. However, based on the geological information and field survey, the imactite should be the product when Akebulake iron impacted directly on the granite base rock.

Petrographic Texture and Shock Effects: The impactite has a kind of vitriphyric texture consisting mainly of quartz phenocrysts among a large number of glass matrix. There are a lot of bubbles in glass. The other shock effects mainly include: (1) Except the relicts of quartz, other major minerals are shocked into glassy melt, the glass has two kinds of white and brown bands which probably originated from plagioclase and biotite; (2) the quartz grains have mosaic fractures, generally with wavy extinction, some with mosaic extinction, and some boundary has converted into diaplectic glass; (3) some zircon grains were decomposed to ZrO2 and SiO2 to form symplectite rims; (4) no high-pressure polymorphs was not found yet.

Mineral Chemistry: Based on EPMA analyses, the glass show varying features: (1) the white band glass has relative high SiO2 (63.4 wt%), Al2O3 (21.6 wt%), Na2O (4.76 wt%) and K2O (5.96 wt%) contents while the brown band has high FeO (6.04 wt%), MgO (3.47 wt%) and CaO (6.77 wt%) contents; (2) the quartz relict grain has the SiO2 of 98.9 wt% and less other elements (e.g. FeO (0.15 wt%), Al2O3 (0.06 wt%), TiO2 (0.06 wt%), K2O (0.05 wt%)); (3) the diaplectic glass of quartz is nearly pure of SiO2 only with less of FeO (0.10 wt%).

Discussion: The impactite should originate from target granite, hence, it is of great significance of gaining insight into the conditions of the impact of the iron meteorite. Based on the shock effects, especially the diaplectic glass convertion of quartz, the peak shock pressure is estimated as 50-60 GPa, the peak temperature should be probably about 1800 ℃. In addition, the compositions of the white and brown glass bands, coupled with geological setting and a half-melted granite fragment, suggest that the target rock of Akebulake iron meteorite should be a biotite granite or monzonitic granite.

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References: [1] Wang K. and Shu W. (2016) *Chinese Science Bulletin* 61: 2834-2842 (in Chinese with English abstract). [2]Stöffler D. and Langenhorst F. (1994) *Meteoritics* 29:155-181.