QUENCHED INDICATOR OF CARBON-BEARING SOLIDS FOUND IN THE NIO METEORITE.

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Introduction: Mineral solids of meteorites formed by any collision process are generally discussed of crystalline minerals and chemical composition [1]. Quenched process of collisions in meteorites are mainly found by round shapes of many chondrules[2-4]. The present paper is discussed on quenched formations of carbon-bearing solids formed at fusion crust and chondrules of the Nio chondrite shower, which can be applied as quenched indicator of many meteorite collisions and formation in the Solar System.

Significance of cooling process of dynamic meteorite activity: Cooling process is previously found by textures of grains and glassy solids. Carbon-bearing grains are considered to be significant indicator of rapid cooling process, because volatile element and stable phases of mineral, vapor and liquid states are principal states of high-temperature and pressure reactions of shocked collisions and evaporated impact ejection [1-4].

Carbon-bearing solids formed by rapid reaction: Macroscopic evidences of quenched indicator of meteorite are proved by formation of glassy solids and shocked textures previously, where it shows mainly descriptive expression of glass and shocked lamellae. Present paper indicates that submicroscopic and dynamic signature of shocked evidence is related with state changes among solid-liquid-vapor (SLV) states during quenched process with carbon-bearing element considered as stable vapor element in the SLV states [1-4].

Carbon-bearing solids of natural and artificial products: Hot jet-stream of carbon dioxide air has been experimentally putted on rock to observe carbon-bearing grains with the analytical FE-SEM machine. Many fine grains with various compositions have been obtained as solidified grains on the surface. Natural volcanic and meteoritic impact rocks shows carbon-bearing grains formed by fired and/or shocked reaction with dynamic carbon streams, where submicroscopic carbon-bearing grains have been observed with the FE-SEM instrument [1-4].

Historical meteoritic shower of the Nio chondrite: The Nio meteorite shower (observed on 1897AD, Meiji 30) has been recorded 2 pieces (Niho site) and 3 pieces (Miyano site) by the Yamaguchi Prefectural Office and Police Station (at the Tokyo Nichi-Nichi News Paper), where 2 more pieces missing (at Niho site) and one piece (at Miyano site) are remained now. Our research group has been investigated huge meteoritic fragments at two impact sites (at Niho and Miyano). The FESEM investigation of the collected fragments (by magnetic separation method in the rice-paddy solids) have been obtained by characteristic iron and carbon-rich spherules (quenched by meteoritic shower process in air) [2] .

Evidence of quenched process of Nio chondritic meteorite: Characteristic evidence of quenched process at meteorite formation in the Solar System have been obtained by characteristic magnesium and carbon-rich chondrule from present study of the Nio chondritic meteorite. The same method of quenched process can be applied to other meteorites (the Chelyabinsk Meteorite fallen in 2013 and the Hayabusa samples etc.).

Figure 1. Electron-micrograph of FeC-bearing spherule formed by quenched process from the Nio meteorite shower in air , which has been collected by magnetic separation method at impact site of the Nio rice-paddy soils.

Summary: The present study can be summarized as follows. 1) Quenched formations of carbon-bearing solids are discussed on any FeC-bearing fusion crust and MgC-bearing chondrules of the Nio chondrite shower. 2) Quenched indicator of carbon-bearing grains can be applied to many meteorite collisions and formation in the Solar System.

References: [1] Miura Y. (1986) *LPSC XVII*, Abstract #1258. [2] Miura Y. (2001) *Meteoritics & Planetary Science* 36:A136. [3] Miura Y. (2017): *LPSC2017*, Abstract #3028. [4] Miura Y. (2017): *JpGU-AGU 2017 (Makuhari, Japan)*, Abstracts #C5357, #C2249, # C2158