Formation of Carbon-rich Grains in Air by Meteoritic Showers of the Nio and Chelyabinsk

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Abstract

Carbon separation and concentration process can be found at explosions of meteorite shower in air of Nio (Japan) and the Chelyabinsk (Russia) meteorites. The present results suggest that two meteorite shower produce carbon-rich FeS and moissanite SiC grains which have been considered to be originated from the comet and/or previous sediments of impact sites. Carbon concentration process by explosions of meteoritic is considered to be new site and sources between extraterrestrial and terrestrial locations. The present result proves new carbon source of impact-related sites (without any craters or meteorites).

Introduction

Carbon-rich sources of carbon-bearing materials are largely unknown in cosmic space from carbon-star interior formation to any celestial bodies by collision impact process. Carbon-rich materials are difficult to be separated by normal condition of fluids and rocks. We have reported recently that carbon-rich grains can be obtained at collision explosions in Earth’s atmosphere by meteorite showers of the Nio and Chelyabinsk meteorites [1, 2]. The purpose of the present paper is to elucidate the formation of carbon-rich grains formed by meteorite showers in air.

Carbon-rich grains of the Nio meteorite

The Nio meteorite (H3-4) fallen on Nio to Miyano, Yamaguchi, Japan (night on 8th August, 1897) by meteoritic shower has been collected many fragments of 1,212 spherules and 40 pieces on the old rice-paddy [2] (with 4 to 5 concentration sites with the reported meteorites are 2 to 3 pieces) and carbon-rich grains (<60%C) of FeC in compositions.

Carbon-rich grains of the Chelyabinsk meteorite

The Chelyabinsk meteorite (I.I5) fallen recently (15th February, 2013) showed meteoritic shower which have been collected many “fragments” of ca. 400 pieces on the fields (ca. 3.5kg in total).

1) The samples in this study are collected at Deputaskiy, Russia (Nos.CH-19 to 21; carbon-rich No.19, mixed No.20 and complete new fragments No.21 with carbon) and unknown field (sample No.22 similar to No. 20) [2].

2) All exploded fragments contain significant carbon contents with analytical FE-SEM of the most carbon-rich grains (>80%C) at the completely melted sample (No.19) among partial melted sample (No.20) and re-melting crystalline material SiC (No.21) [2].

Carbon concentration sites

Terrestrial carbon sources are complicated from the deep interior to shallow surface in planet Earth as unknown source, though there are no consideration on sources of meteoritic asteroids concentrated on meteoritic shower explosions in air. The present results are new carbon- concentrated source within Earth’s air by meteorite shower process, which might be significant clues for carbon-rich materials on the air planet of the Solar System [2, 3].

Conclusion

The present study is summarized as follows:
1) Carbon separation and concentration process can be formed at explosions of meteorite shower in air of the Nio (Japan) and Chelyabinsk (Russia) meteorites.
2) The present results suggest air-production of carbon and carbon-rich FeS and moissanite SiC grains.
3) Carbon concentration process by meteoritic explosions is new impact in air between extraterrestrial and terrestrial locations.

References


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