Presolar grains in L3.1 chondrite Jiddat al Harasis026

Azusa Tonotani[1]; Sachio Kobayashi[2]; Kazuhide Nagashima[3]; Hisayoshi Yurimoto[1]

[1] Earth & Planet. Sci., Titech; [2] Earth and Planetary Sci., Titech; [3] Earth and Planetary Sci., Tokyo Inst. Tech.

Introduction

Isotopic compositions of presolar grains are quite different from those of our solar system. The origin of those grains defined as stardusts that formed in various ancient star before solar system. Presolar grains have been discovered in various meteorite groups. Espetially, there are many studies for presolar grains in carbonaceous chondrites (e.g. Kobayashi et al., 2005). The types of presolar grains in carbonaceous chondrites are mainly composed of Diamond, SiC, Graphite, Silicon nitrides, Oxides, and Silicates. (e.g. Huss et al., 2003, Nagashima et al., 2004).

On the other hand, presolar oxides, SiC, graphite, and diamond in ordinary chondrite were discovered from study by residues after chemical treatment (e.g. Alexander et al, 1990; Huss et al., 2002; Lodders and Amari., 2004), and presolar silicateswere by in-situ analysis of two ordinary chondrites, Semarkona (LL3.0) and Bishunpur (LL3.1) (Mostefaoui et al., 2003, 2004). The abundances are estimated to about 15ppm.

In this study, We are report the origin and the abundances of presolar grains from Jiddat al Harasis 026 L3.1 chondrite, using isotopography (in-situ two dimensional isotope mapping) of an isotope microscope.

Experimental method

The sample is a thin section of Jiddat al Harasis 026 (L3.1) chondrite. To search for presolar grains, isotope imaging was conducted using a Titech isotope microscope system (Camaca ims-1270 and SCAPS)(Yurimoto et al., 2003). The discovered presolar grains were identified the minerals species by using a SEM-EDS.

Results and discussion

Six presolar grains from the L3.1 chondrite are discovered in matrix regions of Jiddat al Harasis 026 (L3.1) of 130000 square micrometers. The presolar grains were identified as SiC (3), graphite (2), and Silicate (1). The size of these grains is about 0.3-1micrometer for SiC and graphite. The abundances of these grains are SiC (9.5ppm), graphite (1.3ppm), Silicate (1ppm).

In this study, the abundances of SiC and graphite are higher than that of silicate. In addition, the abundance of silicate grain from L3.1 chondrtie is lower than those of previous study in Semarkona (LL3.0) and Bishunpur (LL3.1) (Mostefaoui et al., 2004).

O isotopic ratio of a silicate grain represents 17O excess and nearly normal 18O/17O ratios. This grain is categorized into group 1 of presolar oxide grains which is believed to have formed in the winds of O-rich red giant and asymptotic giant branch (AGB) stars (Nittler et al., 1997).