PRESOLAR GRAINS IN PRIMITIVE ENSTATITE CHONDRITES. S. Ebata[1] and H. Yurimoto[1], [1]Department of Natural History Sciences, Hokkaido University, Sapporo 060-0810, Japan. E-mail: ebashin@ep.sci.hokudai.ac.jp.

Introduction: Presolar grains predated the formation of our solar system. Presolar grains are identified by isotopic anomalies from several type IDPs, chondrites and AMMs [e.g. 1-5]. Enstatite chondrites (hereafter ECs), ordinary chondrites and carbonaceous chondrites are typical types of primitive meteorites. These chondrites reflect redox conditions in the early solar nebula. ECs were formed under highly reducing nebula conditions [e.g. 6]. Krot et al. (2000) proposed that the redox condition was formed by enrichments of presolar carbonaceous grains [7]. If these are true, abundances and species of presolar grains are unique in ECs. The purpose of this study is to determine mineral species of presolar grains in enstatite chondrites in order to understand decomposition processes by reduced condition in the early solar nebula.

Experimental: The HokuDai isotope microscope system (Cameca ims-1270 + SCAPS [8]) was used for high precision isotope imaging. A FESEM-EDS system (JEOL JSM-7000F + Oxford INCA Energy) was used for mineralogical study and for mineral identification of presolar grains. Samples used in this study were three EH3 chondrites; ALHA81189, Yamato-691 and SAH97072.

Results: The chemical compositions were determined for eight presolar silicate grains; Pyroxene: 6 (the volume abundance: 11 ppm), Olivine: 1 (0.33 ppm), SiO_2: 1 (0.32 ppm). In the case of presolar carbonaceous grains (hereafter C-grains), the chemical compositions were determined for thirteen grains; graphite: 7 (2.7 ppm), SiC: 6 (11 ppm). Out of 13, 2 presolar C-grains surrounded by sulfides were identified.

Discussion: Abundances of presolar graphites were about 10 times larger than those in other type 3 chondrites [9, 10]. This suggests presolar graphites were selectively survived in the ECs parent body or in the ECs forming region in the solar nebula because graphite phase is one of the most stable solid under reduced environment [e.g. 11]. Presolar grains of pyroxene compositions are dominant in ECs. This suggests presolar silicates of enstatite composition were selectively survived in the ECs parent body or in the ECs forming region in the solar nebula, which is consistent with the redox state. Presolar C-grains surrounded by troilite and metal layer was observed. One of the C-grain is attached with olivine. Isotopic compositions of the olivine and sulfide are indistinguishable from solar. These results suggest that minerals were condensed on presolar grains in the solar nebula.

This study shows that species of presolar grains in ECs are consist with the redox conditions in the ECs parent body suggesting matrix constituents of ECs have been heated in extremely reduced solar nebula.

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