Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PPS22-P03 Room:Convention Hall Time:May 27 18:15-19:30

Hydrogen diffusion experiment of apatite crystal.

ITOH, Shoichi[1*] ; HASHIGUCHI, Minako[2] ; SAKAGUCHI, Isao[2] ; SAKATA, Shuhei[1] ; HIRATA, Takafumi[1]

[1]Department of Earth and planetary sciences, Kyoto University, [2]National institute for materials science

Recently many studies focused on the origin of water in the solar system and Earth with Chondrite, differentiated meteorite, Moon and Mars (e.g., Greenwood et al., 2008; Greenwood et al., 2011; Alexander et al., 2012). Especially H_2O and hydrogen isotopic compositions of apatite in the Moon and ordinary chondrites has been discussed about the origin of water in the magma of the Moon and at the Earth orbit material (Greenwood et al., 2011; Yanai et al., 2014). However, it is still controversial about the origin of water in the apatite grain since it is unclear about the investigation of H-diffusivity in the apatite during thermal metamorphism in the magma and parent body. In this study, we performed H-diffusion experiments using fluorapatite.

Some slices from a durango apatite grain were used in the H-diffusion experiment. These slices polished with diamond are with mirror surface and then were annealed under D_2O/O_2 gas at 400oC-700oC for several hours. H-diffusion coefficients in the samples were determined using depth profiles of D concentration of the samples obtained by secondary ion mass spectrometry (SIMS) (Cameca ims-4f-E7 at Kyoto university and Cameca ims-4f at NIMS). The water content of these slices of a apatite grain were measured and minor impurities of apatite were also measured using SIMS.

In this talk we will report H-diffusion coefficient in the apatite using H-diffusion experiment and discuss about investigation of H-diffusivity in the apatite.

Keywords: Hydrogen, apatite, diffusion coefficient, early solar system, SIMS