

Crystallization process of amorphous silicate with the chondritic composition : Effects of oxidation-reduction condition of iron

Takashi Takakura[1]; Keisuke Murata[1]; Hiroki Chihara[2]; Chiyoeko Koike[3]; Akira Tsuchiyama[1]

[1] Earth and Space Sci., Osaka Univ.; [2] Dept. of Earth and Space Sci., Osaka Univ.; [3] Kyoto Pharmaceutical Univ.

We examined crystallization behavior of amorphous silicate with the chondritic composition. The amorphous sample was synthesized by the sol-gel method, and partially crystallized samples were made from the amorphous sample by annealing in controlled oxygen fugacity. The samples were analyzed by X-ray diffraction, SEM-imaging and Infrared absorption spectroscopy. We found that (1) the IR absorption features of the initial amorphous samples were almost same in spite of the different iron content, (2) the rate of crystallization was faster for the higher iron content samples, and (3) the composition of the crystallized olivine was extremely Mg-rich compared with the initial amorphous composition at the first stage of the crystallization process. These results suggest that the Mg-rich crystalline olivine can be transformed from the amorphous silicate, even if it contains Fe²⁺ ion.