

Crystal structure of Norbergite under high-pressure condition up to 6.1 GPa

Takahiro Kuribayashi[1]; Masahiko Tanaka[2]; Yasuhiro Kudoh[3]

[1] Tohoku Univ.; [2] Photon Factory, KEK; [3] Tohoku Univ

High-pressure single crystal X-ray diffraction study of norbergite, $\text{Mg}_3\text{SiH}_2\text{O}_6$, were performed using diamond anvil cell with synchrotron radiation at ambient temperature to clarify the effects of pressure on the crystal structure of norbergite. The linear compressibilities of each axis of norbergite were $b_a=2.11$, $b_b=3.09$, $b_c=2.93$ ($\times 10^{-3}/\text{GPa}$). The isothermal bulk modulus of norbergite, calculated from Birch-Murnaghan equation of state, was $K=108(2)$ GPa ($K'=4$ fixed). This result is consistent with the relationship of density and bulk modulus in humite minerals. The linear compressibility of a-axis of norbergite is much higher than that of other humite minerals such as chondrodite. The chemical composition of this sample is nearly F end-membered. The difference of the compression property of the [100] direction between other humite minerals suggested the effects of fluorine on the structures of humite minerals.