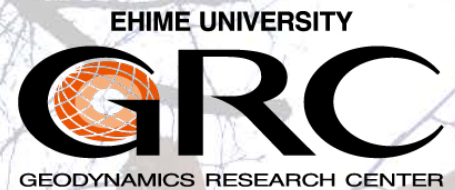


In situ X ray observations of crystallization of grossular glass under high pressure and high temperature

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Irifune et al. (2016) demonstrated that direct conversion from bulk glass starting material leads to highly transparent nanopolycrystalline grossular garnet at pressures above ~10 GPa at temperatures around 1400°C. Crystallization temperature of grossular from glass under high pressure is important for this technique, which is not well constrained in Irifune et al. (2016). Moreover, understanding crystallization processes of glass under high pressure is important in making the transparent nanopolycrystalline ceramics, but no study on this crystallization processes was reported. In the present study, I tried to constrain the crystallization processes of grossular from glass using in situ X-ray diffraction measurements with time-resolved measurements, as well as X-ray imaging techniques under high pressure. In situ X-ray observations were conducted at 12 and 15 GPa, using multianvil apparatus at BLo4B1, SPring-8. First, the pressure was increased and then temperature was increased slowly, taking X-ray diffraction data and X-ray radiographic images in every 50°C. Crystallization of grossular started at 1150°C and 12-15 GPa, which are slightly higher than those (~1050°C) reported in my previous results. Significant decreases of the sample length were observed by the X-ray imaging around 1050°C of both samples. Crystallization rate at 12 GPa, 1150°C is relatively higher than that at 15 GPa, 1150°C. Moreover, crystallization rate at 15 GPa, 1150°C is similar with obtained at 8 GPa, 1050°C in my previous study. Another parts of the results will be shown in this talk.