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High-pressure synthesis of $\text{BiFeO}_3\text{-BiAlO}_3$ and $\text{BiFeO}_3\text{-MnTiO}_3$ solid solution GEN SHIMURA, KEIJI KUSABA, TETSUYA MIYAWAKI, KEN NIWA, HIDEFUMI ASANO, MASASHI HASEGAWA, Nagoya University — There have been so many investigations for high-pressure synthesis of perovskite-type oxides in the material science field. Multiferroic material is particularly attracted in the field of electronic device materials. BiFeO_3 (ferroelectric antiferromagnet) is known as the only Bi-contained perovskite which can be synthesized at ambient pressure. We investigated solid solution systems of $\text{BiFeO}_3\text{-BiAlO}_3$ and $\text{BiFeO}_3\text{-MnTiO}_3$ under high pressure and high temperature to synthesize a new multiferroic compound in the present study. Chemical reagents of simple oxides were mixed with a mortar as a starting material. The mixture was rapped with a gold foil, and it encased in a cubic pressure-medium with a graphite furnace. High pressure experiments were carried out using two DIA-type high pressure apparatuses installed in Nagoya University. X-ray powder diffraction patterns of all recovered specimens were collected using $\text{Cu-K}\alpha$ radiation and magnetic susceptibilities for some of the recovered specimens were measured using a vibrating sample magnetometer. In the system of $\text{BiFeO}_3\text{-BiAlO}_3$, the BiFeO_3 -type solid solution was only obtained in the both Fe- and Al-rich composition. While in the system of $\text{BiFeO}_3\text{-MnTiO}_3$, no solid solutions were observed.

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