

Sector-zoned osumilite from Hayato, Kagoshima Prefecture, Japan

*Tomoaki Matsui¹

1. Department of Geology, Faculty of Education, Kagoshima University

Sector-zoned osumilite from Hayato, Kagoshima Prefecture, Japan, was investigated by optical microscopy, X-ray diffractometry, and electron microprobe analysis. Well-shaped hexagonal tabular crystals of osumilite approximately 1-2 mm in size were present in small cavities in rhyolitic lava on the northern rim of Aira Caldera. To the naked eye, the most remarkable property of the crystals was their changing color depending on viewing angle: dark blue on the basal faces and pale yellowish brown on the faces perpendicular to them. Two kinds of oriented thin sections parallel or perpendicular to the c-axis direction of the osumilite crystals were observed under an optical microscope. In the thin sections, the crystals were dichroic with light blue to bluish purple in an hourglass structure under plane-polarized light and exhibited uniaxial character under cross polars, in contrast to cordierite. The powder diffraction pattern showed complete agreement with the crystal structure of osumilite. Chemical analysis revealed that the osumilite crystal was composed of two sectors, namely, {0001} and {11-20} sectors, with slightly compositional variation in major elements, especially Fe and Mg. Although the valence state of Fe is still under investigation, it seems that these two sectors have a slight difference in Fe content at T2 sites as a result of stoichiometric considerations. These optical and chemical features appear to have been influenced by the environment of osumilite formation in the rhyolitic lava from Hayato, which mineralogically characterizes the pre-caldera volcanic activity in the Aira region.

Keywords: osumilite, sector zoning, Hayato