

Scandiobabingtonite, a new mineral from the Baveno pegmatite, Piedmont, Italy

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ABSTRACT

Scandiobabingtonite, ideally $\text{Ca}_2(\text{Fe}^{2+}, \text{Mn})\text{ScSi}_5\text{O}_{14}(\text{OH})$ is the scandium analogue of babingtonite; it was found in a pegmatitic cavity of the Baveno granite associated with orthoclase, albite, muscovite, stilbite, and fluorite. Its optics are biaxial (+) with $2V = 64(2)^\circ$, $\alpha = 1.686(2)$, $\beta = 1.694(3)$, $\gamma = 1.709(2)$. $D_{\text{meas}} = 3.24(5)$ g/cm³, $D_{\text{calc}} = 3.24$ g/cm³, and $Z = 2$. Scandiobabingtonite is colorless or pale gray-green, transparent, with vitreous luster. It occurs as submillimeter sized, short, tabular crystals, slightly elongated on [001], and characterized by the association of forms {010}, {001}, {110}, {1 $\bar{1}$ 0}, and {101}. It occurs also as a thin rim encrusting small crystals of babingtonite. The strongest lines in the X-ray powder pattern are at 2.969 (S), 2.895 (S), 3.14 (mS), and 2.755 (mS) Å. The mineral is triclinic, space group $P\bar{1}$, with $a = 7.536(2)$, $b = 11.734(2)$, $c = 6.748(2)$ Å, $\alpha = 91.70(2)$, $\beta = 93.86(2)$, $\gamma = 104.53(2)^\circ$. Scandiobabingtonite is isostructural with babingtonite, with Sc replacing Fe^{3+} in sixfold coordination, but no substitution of Fe^{2+} by Sc takes place. Due to the lack of a suitably large crystal of the new species, such a replacement has been confirmed by refining the crystal structure of a Sc-rich babingtonite (final $R = 0.047$) using single-crystal X-ray diffraction (XRD) data.