

Allanite-(Nd), $\text{CaNdAl}_2\text{Fe}^{2+}(\text{SiO}_4)(\text{Si}_2\text{O}_7)\text{O}(\text{OH})$, a new mineral from Åskagen, Sweden

RADEK ŠKODA,^{1,*} JAN CEMPÍREK,² JAN FILIP,³ MILAN NOVÁK,¹ FRANTIŠEK VESELOVSKÝ,⁴ AND RADIM ČTVRTLÍK³

¹Department of Geological Sciences, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic

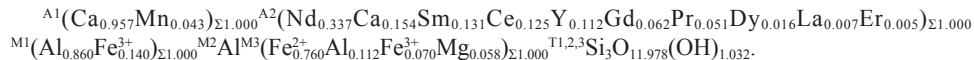
²Department of Mineralogy and Petrology, Moravian Museum, Zelný Trh 6, 659 37 Brno, Czech Republic

³Regional Centre of Advanced Technologies and Materials, Faculty of Science, Palacký University, 17. listopadu 12, 771 46 Olomouc, Czech Republic

⁴Czech Geological Survey, Geologická 6, 152 00 Praha, Czech Republic

ABSTRACT

Allanite-(Nd), ideally $\text{CaNdAl}_2\text{Fe}^{2+}(\text{SiO}_4)(\text{Si}_2\text{O}_7)\text{O}(\text{OH})$, the Nd-analog of allanite-(Ce), occurs in the Åskagen pegmatite, central Sweden. It forms fine-grained aggregates within altered thalénite-(Y). The other associated minerals include: iimoriite-(Y), keiviite-(Y), allanite-(Y), and tengerite-(Y). Allanite-(Nd) is biaxial (–); with refractive indices $\alpha = 1.723(5)$, $\beta = 1.754(7)$, $\gamma = 1.772(5)$, and measured $2V = 82^\circ(\pm 3^\circ)$. Larger fragments of allanite-(Nd) are moderately pleochroic ($\alpha =$ pale grayish-brown, $\gamma =$ grayish-brown); small fragments are colorless. Allanite-(Nd) is monoclinic, space group $P2_1/m$, with the following unit-cell parameters: $a = 8.8897(5)$, $b = 5.7308(2)$, $c = 10.1010(6)$ Å, $\beta = 115.166(7)^\circ$, $V = 465.75(4)$ Å³, $Z = 2$. The strongest five peaks from the X-ray powder diffraction patterns [d (Å)(I)(hkl)] are: 3.51(46)($\bar{2}11$), 2.89(100)($\bar{1}13$), 2.87(45)(020), 2.70(60)(120), 2.61(60)($\bar{3}11$). Allanite-(Nd) has a density of 3.98 g/cm³, vitreous luster, grayish-brown streak, and the Mohs hardness is ca. 6. It is brittle, with imperfect cleavage, and conchoidal fracture. The Mössbauer spectroscopy revealed $\text{Fe}^{3+}/\text{Fe}_{\text{tot}}$ ratio of 0.27 in the type sample. The refined empirical formula of the crystal used for the structure determination is:



The allanite-(Nd) was approved by CNMNC (IMA 2010-060).

Keywords: Epidote supergroup, allanite, neodymium, pegmatite, Åskagen