

**Manganiakasakaite-(La)****CaLa(Mn<sup>3+</sup>AlMn<sup>2+</sup>)[Si<sub>2</sub>O<sub>7</sub>][SiO<sub>4</sub>]O(OH)**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As subhedral grains to 0.5 mm embedded in pyroxmangite.

**Physical Properties:** *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Irregular to conchoidal. Hardness = 5.5-6 (by analogy in the allanite group) D(meas.) = n.d. D(calc.) = 4.09 Non-fluorescent. Indistinguishable from ferriakasakaite-(Ce) based on physical properties alone.

**Optical Properties:** Transparent. *Color:* Dark brown. *Streak:* Brown. *Luster:* Vitreous. *Optical Class:* Biaxial. *n*(calc.) = 1.860

**Cell Data:** *Space Group:* P2<sub>1</sub>/m. *a* = 8.9057(10) *b* = 5.7294(6) *c* = 10.1134(11)  $\beta$  = 113.713(5)° *Z* = 2

**X-Ray Diffraction Pattern:** Monte Maniglia, Bellino, Varaita Valley, Cuneo Province, Italy. 2.899 (s), 2.711 (ms), 3.516 (m), 2.621 (m), 2.109 (m), 2.179 (mw), 2.165 (mw)

Chemistry:	(1)	(2)
SiO <sub>2</sub>	30.69	29.59
Al <sub>2</sub> O <sub>3</sub>	10.39	8.37
V <sub>2</sub> O <sub>3</sub>	0.17	
Fe <sub>2</sub> O <sub>3</sub>	3.87	
Y <sub>2</sub> O <sub>3</sub>	0.17	
La <sub>2</sub> O <sub>3</sub>	14.61	26.75
Ce <sub>2</sub> O <sub>3</sub>	1.88	
Pr <sub>2</sub> O <sub>3</sub>	2.04	
Nd <sub>2</sub> O <sub>3</sub>	2.21	
Gd <sub>2</sub> O <sub>3</sub>	0.10	
MgO	0.88	
CaO	8.28	9.21
MnO <sub>total</sub>	21.58	
MnO	[11.98]	11.65
Mn <sub>2</sub> O <sub>3</sub>	[10.69]	12.96
H <sub>2</sub> O	[1.5]	1.48
Total	99.50	100.01

(1) Monte Maniglia, Bellino, Varaita Valley, Cuneo Province, Piedmont, Italy; average electron microprobe analysis, calculated values for MnO, Mn<sub>2</sub>O<sub>3</sub> and H<sub>2</sub>O; corresponds to <sup>A(1)</sup>(Ca<sub>0.62</sub>Mn<sub>0.38</sub>)<sup>A(2)</sup>(La<sub>0.52</sub>Nd<sub>0.08</sub>Pr<sub>0.07</sub>Ce<sub>0.07</sub>Y<sub>0.01</sub>Ca<sub>0.25</sub>)<sup>M(1)</sup>(Mn<sup>3+</sup><sub>0.52</sub>Fe<sup>3+</sup><sub>0.28</sub>Al<sub>0.18</sub>V<sup>3+</sup><sub>0.01</sub>)<sup>M(2)</sup>Al<sub>1.00</sub><sup>M(3)</sup>(Mn<sup>2+</sup><sub>0.60</sub>Mn<sup>3+</sup><sub>0.27</sub>Mg<sub>0.13</sub>)<sup>T(1-3)</sup>(Si<sub>2.99</sub>Al<sub>0.01</sub>)O<sub>12</sub>(OH). (2) CaLa(Mn<sup>3+</sup>AlMn<sup>2+</sup>)[Si<sub>2</sub>O<sub>7</sub>][SiO<sub>4</sub>]O(OH).

**Mineral Group:** Epidote supergroup, allanite group.

**Occurrence:** In a manganese deposit in metasedimentary rocks.

**Association:** Pyroxmangite.

**Distribution:** Monte Maniglia, Bellino, Varaita Valley, Cuneo Province, Piedmont, Italy.

**Name:** A prefix identifies the dominant cation at the *M*(1) site (other than Al), and a suffix for the dominant *REE* at the *A*(2) site in a member of the group with *A*(1) = Ca and *M*(3) = Mn<sup>2+</sup> which is “akasakaite” (honoring Masahide Akasaka, professor of mineralogy at the Shimane University)

**Type Material:** Natural History Museum, University of Pisa, Italy (19907).

**References:** (1) Biagioni, C., P. Bonazzi, M. Pasero, F. Zaccarini, C. Balestra, R. Bracco, and M.E. Ciriotti (2019) Manganiakasakaite-(La) and ferriakasakaite-(Ce), two new epidote supergroup minerals from Piedmont, Italy. *Minerals*, 9, 353, 1-15.