

**Magnesiosadanagaite****NaCa<sub>2</sub>[Mg<sub>3</sub>(Al,Fe<sup>3+</sup>)<sub>2</sub>]Si<sub>5</sub>Al<sub>3</sub>O<sub>22</sub>(OH)<sub>2</sub>**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As rims ~150 μm thick on prismatic pargasite crystals to 3 mm.

**Physical Properties:** *Cleavage:* Perfect on {110}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5.5-6 VHN = 665-792 (100 g load). D(meas.) = n.d. D(calc.) = 3.179

**Optical Properties:** Translucent. *Color:* Black. *Streak:* Reddish brown. *Luster:* Vitreous. *Optical Class:* Biaxial (+).  $\alpha = 1.674(2)$   $\beta(\text{calc.}) = 1.683$   $\gamma = 1.694(2)$   $2V(\text{meas.}) = 80-90^\circ$   $2V(\text{calc.}) = \text{n.d.}$  *Orientation:*  $Y = b$ ,  $Z \wedge c = 20^\circ$ . *Pleochroism:*  $X = \text{pale yellow}$ ,  $Y = \text{yellowish brown}$ ,  $Z = \text{reddish brown}$ .

**Cell Data:** *Space Group:* C2/m.  $a = 9.857(2)$   $b = 17.899(4)$   $c = 5.318(1)$   $\beta = 105.36(1)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Kasuga mine, Gifu Prefecture, central Japan. 8.38 (100), 2.56 (90), 3.11 (80), 2.70 (80), 2.34 (80), 2.58 (75), 1.587 (70)

Chemistry:	(1)		(2)		
	(1)	(2)	(1)	(2)	
SiO <sub>2</sub>	38.42	37.1	CaO	12.77	12.5
Al <sub>2</sub> O <sub>3</sub>	22.20	20.9	Na <sub>2</sub> O	3.14	3.33
TiO <sub>2</sub>	1.48	2.70	K <sub>2</sub> O	0.92	0.49
Cr <sub>2</sub> O <sub>3</sub>	0.60	0.01	F	0.94	0.29
FeO	1.92	[6.22]	Cl		0.02
Fe <sub>2</sub> O <sub>3</sub>		[0.60]	H <sub>2</sub> O	[1.66]	[1.92]
MnO		0.18	- O = F	0.40	0.12
MgO	15.81	13.4	Total	99.46	99.52

(1) Dattaw mine, Mogok Stone Tract, Myanmar; average of 10 electron microprobe analyses, H<sub>2</sub>O calculated from structure analysis; corresponding to (Na<sub>0.82</sub>K<sub>0.17</sub>) $\Sigma=0.99$ (Ca<sub>1.95</sub>Na<sub>0.05</sub>) $\Sigma=2.00$ (Mg<sub>3.36</sub>Fe<sup>2+</sup><sub>0.23</sub>Al<sub>1.20</sub>Cr<sup>3+</sup><sub>0.07</sub>Ti<sup>4+</sup><sub>0.16</sub>) $\Sigma=5.02$ (Si<sub>5.47</sub>Al<sub>2.53</sub>) $\Sigma=8.00$ O<sub>22</sub>[(OH)<sub>1.58</sub>F<sub>0.42</sub>]. (2) Kasuga mine, Japan; electron microprobe analysis, H<sub>2</sub>O and FeO calculated; corresponds to (Na<sub>0.91</sub>K<sub>0.09</sub>) $\Sigma=1.00$ (Ca<sub>1.95</sub>Na<sub>0.03</sub>) $\Sigma=1.98$ (Mg<sub>2.90</sub>Fe<sup>2+</sup><sub>0.76</sub>Al<sub>0.98</sub>Fe<sup>3+</sup><sub>0.07</sub>Cr<sup>3+</sup><sub>0.00</sub>Ti<sup>4+</sup><sub>0.30</sub>Mn<sub>0.02</sub>) $\Sigma=5.03$ (Si<sub>5.40</sub>Al<sub>2.60</sub>) $\Sigma=8.00$ O<sub>22</sub>[(OH)<sub>1.58</sub>F<sub>0.42</sub>].

**Mineral Group:** Amphibole supergroup, calcium amphibole subgroup.

**Occurrence:** In a granitic contact aureole composed of dolomitic marble (Japan).

**Association:** Phlogopite, titanite, calcite, pyrrhotite, chalcopyrite (Japan); calcite, corundum, phlogopite (Myanmar).

**Distribution:** At the Dattaw mine, Mogok Stone Tract, Mandalay Division, Myanmar; from the Kawai pit, Kasuga mine, Gifu Prefecture, central Japan.

**Name:** Signifies an amphibole in the compositional range of *sadanagaite* with Mg dominant in the C structural site.

**Type Material:** National Science Museum, Tokyo (NSM-M28307) and at the Geological Museum, Geological Survey of Japan, Tsukuba (GSJ M35151), Japan.

**References:** (1) Banno, Y., R. Miyawaki, S. Matsubara, K. Makino, M. Bunno, S. Yamada, and T. Kamiya (2004) Magnesiosadanagaite, a new member of the amphibole group from Kasuga-mura, Gifu Prefecture, central Japan. *Eur. J. Mineral.*, 16, 177-183. (2) (2004) *Amer. Mineral.*, 89, 1829-1830 (abs. ref. 1). (3) Hawthorne, F.C. and G.E. Harlow (2008) The crystal chemistry of Al-rich amphiboles: sadanagaite and potassic-ferrisadanagaite. *Can. Mineral.*, 46, 151-162. (4) Hawthorne, F.C., R. Oberti, G.E. Harlow, W.V. Maresch, R.F. Martin, J.C. Schumacher, and M.D. Welch (2012) Nomenclature of the amphibole supergroup. *Amer. Mineral.*, 97, 2031-2048.