

**Crystal Data:** Hexagonal. *Point Group:* 6mm. Euhedral, prismatic crystals are elongate along [001] to 0.5 mm; cleavage traces appear as vertical striations on crystals. Penetration twins common.

**Physical Properties:** *Cleavage:* {100}, good. *Fracture:* Splintery. Hardness = ~6 VHN = 841-907, 880 average (100 g load). D(meas.) = n.d. D(calc.) = 5.13(1)

**Optical Properties:** Opaque. *Color:* Black, dark red and translucent in thin splinters; gray in reflected light. *Streak:* Brown. *Luster:* Submetallic.

*Optical Class:* Uniaxial (-).  $\omega(\text{calc.}) = 2.10$   $\varepsilon(\text{calc.}) = 2.04$

*Pleochroism:* O = dark red, E = orange-red. Weakly birefractant; moderately anisotropic.

R<sub>O</sub>-R<sub>E</sub>: (460) 13.6-12.2, (540) 12.9-11.8, (580) 12.7-11.7, (640) 12.3-11.4

**Cell Data:** *Space Group:* P6<sub>3</sub>mc.  $a = 5.993(1)$   $c = 9.335(2)$   $Z = 1$

**X-ray Powder Pattern:** Garpenberg Norra deposit, Hedemora, south-central Sweden. 2.522 (100), 1.4972 (54), 2.673 (44), 2.994 (43), 3.474 (34), 1.5170 (33), 1.6597 (28)

<b>Chemistry:</b>	(1)
MgO	8.97
Al <sub>2</sub> O <sub>3</sub>	0.82
TiO <sub>2</sub>	0.01
MnO	2.47
Fe <sub>2</sub> O <sub>3</sub>	34.33
ZnO	14.24
Sb <sub>2</sub> O <sub>5</sub>	36.31
<u>H<sub>2</sub>O</u>	<u>[1.99]</u>
Total	99.13

(1) Garpenberg Norra deposit, Hedemora, south-central Sweden; average electron microprobe analysis, Fe<sup>3+</sup> confirmed by Mössbauer spectroscopy, H<sub>2</sub>O calculated; corresponds to Mg<sub>1.95</sub>[Fe<sub>3.88</sub>Al<sub>0.15</sub>]<sub>Σ=4.03</sub>(Zn<sub>1.58</sub>Mn<sub>0.31</sub>Mg<sub>0.06</sub>)<sub>Σ=1.95</sub>Sb<sub>2.03</sub>O<sub>14.01</sub>(OH)<sub>1.99</sub>.

**Occurrence:** In veinlets and lenses in dolomitic marble and silicate skarn hosting a pyritiferous Zn-Pb-Fe-Cu-Sb-Ag-deposit.

**Association:** Tremolite, manganocummingtonite, talc, franklinite, baryte, svabite.

**Distribution:** At the Garpenberg Norra deposit, Hedemora, Dalarna (= Dalecarlia), south-central Sweden.

**Name:** Honors Sven *Rinman* (1720-1792), a mining scientist considered by some to be the father of the Swedish minerals industry.

**Type Material:** Swedish Museum of Natural History, Stockholm (#2000160).

**References:** (1) Holstam, D., K. Gatedal, K. Söderberg, and R. Norrestam (2001) Rinmanite, Zn<sub>2</sub>Sb<sub>2</sub>Mg<sub>2</sub>Fe<sub>4</sub>O<sub>14</sub>(OH)<sub>2</sub>, a new mineral species with a nolanite-type structure from the Garpenberg Norra mine, Dalarna, Sweden. *Can. Mineral.*, 39, 1675-1683. (2) (2003) *Amer. Mineral.*, 88, 252-253 (abs. ref. 1).