

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3}$ . Small crystals are thin to thick tabular, may have rounded {0001}, with {11 $\bar{2}$ 0}, {10 $\bar{1}$ 1}; in subparallel aggregates massive.

**Physical Properties:** *Cleavage:* Perfect on {0001}; indistinct on {10 $\bar{1}$ 1}.  
*Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 5.5–6 D(meas.) = 4.09–4.20  
D(calc.) = 4.18

**Optical Properties:** Transparent. *Color:* Colorless, milky white, sulfur-yellow, lemon-yellow, wine-yellow; colorless in transmitted light. *Luster:* Vitreous, pearly on {0001}.

*Optical Class:* Uniaxial (-).  $\omega = 1.774\text{--}1.778$   $\epsilon = 1.660\text{--}1.661$

**Cell Data:** *Space Group:*  $R\bar{3}$ .  $a = 4.858(1)$   $c = 16.080(2)$   $Z = 3$

**X-ray Powder Pattern:** Jiangsu Province, China.

5.342 (100), 2.900 (28), 1.810 (13), 3.720 (11), 2.673 (8), 4.061 (7), 2.424 (4)

**Chemistry:**

	(1)	(2)	(3)
B <sub>2</sub> O <sub>3</sub>	[23.18]	25.00	25.19
SnO <sub>2</sub>	53.75	51.26	54.52
FeO		0.40	
MgO		0.14	
CaO	20.45	20.48	20.29
rem.	2.62	1.32	
Total	[100.00]	98.60	100.00

(1) Arø Island, Norway; remnant is B<sub>2</sub>O<sub>3</sub> (?) 1.72% and ZrO<sub>2</sub> 0.90%. (2) Jiangsu Province, China; remnant is SiO<sub>2</sub> 0.39%, TiO<sub>2</sub> 0.14%, Al<sub>2</sub>O<sub>3</sub> 0.24%, Cr<sub>2</sub>O<sub>3</sub> 0.01%, MnO 0.01%, BaO 0.11%, SrO 0.04%, H<sub>2</sub>O<sup>+</sup> 0.38%; corresponds to (Ca<sub>1.02</sub>Fe<sub>0.02</sub>Mg<sub>0.01</sub>)<sub>Σ=1.05</sub>Sn<sub>1.06</sub>(BO<sub>3</sub>)<sub>2</sub>.

(3) CaSn(BO<sub>3</sub>)<sub>2</sub>.

**Occurrence:** Very rare in an alkalic pegmatite (Arø Island, Norway); in a hydrothermal deposit in metasomatized marble (Arandis, Namibia); in skarns (China).

**Association:** Meliphanite, homilite, zircon, molybdenite, cancrinite, analcime, feldspar (Arø Island, Norway); tourmaline, cassiterite, stannite, chalcopyrite, pyrrhotite, siderite, calcite (Arandis, Namibia).

**Distribution:** From Arø Island, Langesundsfjord, Norway. At the Stiepelman mine, Arandis, Namibia. In the Titovskoye deposit, polar Sakha, Russia. In China, from the Damoshan deposit, Gejiu tin district, Yunnan Province, at the Dading tin-iron deposits, Guizhou Province, and in an undisclosed deposit, Wuxian Co., Jiangsu Province. On Brooks Mountain, Alaska, USA. At the MW prospect, near Smart River, Cassiar Mountains, Yukon Territory, Canada.

**Name:** Honors Nils Adolf Erik Nordenskiöld (1832–1901), Swedish mineralogist, geologist, and explorer.

**Type Material:** Mineralogical-Geological Museum, University of Oslo, Oslo, Norway, 19973; Swedish Museum of Natural History, Stockholm, Sweden, g30699.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 332–333. (2) Effenberger, H. and J. Zemmann (1986) The detailed crystal structure of nordenskiöldine, CaSn(BO<sub>3</sub>)<sub>2</sub>. Neues Jahrb. Mineral., Monatsh., 111–114. (3) Chen Sisong, Wei Jinsheng, and Huang Kebing (1987) The discovery of nordenskiöldine in Jiangsu Province. Acta Petrolog. Mineralog., 6(4), 364–367 (in Chinese with English abs.).