

**Nickelschneebergite****BiNi<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>[(H<sub>2</sub>O)(OH)]**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As crystals, to 0.5 mm, elongated along [010] and tabular on { $\bar{2}$  01}, showing {001}, {101}, { $\bar{1}$  01}, { $\bar{1}$  02}, and { $\bar{1}$  11}, and in aggregates to 1 mm.

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 4-4.5 VHN = 250 (15 g load). D(meas.) = n.d. D(calc.) = 5.23

**Optical Properties:** Transparent. *Color:* Brown to beige. *Streak:* Pale brown to nearly white. *Luster:* Adamantine.

*Optical Class:* Biaxial (-).  $\alpha$  (calc.) = 1.92  $\beta$  = 1.95(1)  $\gamma$  = 1.97(2)  $2V$ (meas.) = 77(5) $^\circ$   
*Orientation:*  $Y = b$ ,  $X \approx c$ . *Pleochroism:* Weak (variable with Fe content);  $X = Z$  = pale yellow,  $Y$  = light brown.

**Cell Data:** Space Group:  $C2/m$ .  $a = 8.995(1)$   $b = 6.207(1)$   $c = 7.462(1)$   $\beta = 115.00(1)^\circ$   $Z = 2$

**X-ray Powder Pattern:** "Am Roten Berg", Schneeberg, Saxony, Germany. 3.196 (100), 2.980 (72), 1.702 (57), 2.507 (47), 2.821 (44), 4.586 (40), 1.673 (30)

<b>Chemistry:</b>	(1)	(2)
CaO	2.68	2.55
NiO	14.75	15.10
CoO	7.98	8.08
ZnO	0.09	
PbO	0.35	
Fe <sub>2</sub> O <sub>3</sub>	2.19	2.15
Bi <sub>2</sub> O <sub>3</sub>	28.54	28.66
P <sub>2</sub> O <sub>5</sub>	0.08	
As <sub>2</sub> O <sub>5</sub>	38.26	38.73
SO <sub>3</sub>	<0.05	
H <sub>2</sub> O	[4.72]	4.72
Total	99.64	100.00

(1) "Am Roten Berg", Schneeberg, Saxony, Germany; average of 7 electron microprobe analyses, supplemented by Fourier transform infrared spectroscopy, H<sub>2</sub>O calculated; corresponds to

(Bi<sub>0.73</sub>Ca<sub>0.28</sub>Pb<sub>0.01</sub>) $\Sigma=1.02$ (Ni<sub>1.18</sub>Co<sub>0.64</sub>Fe<sub>0.16</sub>) $\Sigma=1.98$ (AsO<sub>4</sub>)<sub>1.99</sub>[(H<sub>2</sub>O)<sub>1.10</sub>(OH)<sub>0.93</sub>] $\Sigma=2.03$ .

(2) BiNi<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>[(H<sub>2</sub>O)(OH)].

**Polymorphism & Series:** Probably complete solid solution involving schneebergite, nickelschneebergite, cobaltlotharmeyerite, and nickellotharmeyerite.

**Mineral Group:** Tsumcorite group.

**Occurrence:** In oxidized mining waste.

**Association:** Schneebergite, quartz, scorodite, barium-pharmacosiderite, ferrilotharmeyerite, preisingerite, waylandite.

**Distribution:** From dump material in the "Am Roten Berg" mining area, ~5 km southwest of Schneeberg, Saxony, Germany.

**Name:** For the essential presence of *nickel* in the compound and relation to *schneebergite*.

**Type Material:** State Museum of Mineralogy and Geology, Dresden, Germany (18633).

**References:** (1) Krause, W., H.-J. Bernhardt, H. Effenberger, and T. Witzke (2002) Schneebergite and nickelschneebergite from Schneeberg, Saxony, Germany: the first Bi-bearing members of the tsumcorite group. *Eur. J. Mineral.*, 14, 115-126. (2) (2003) *Amer. Mineral.*, 88, 253 (abs. ref. 1).