Nickelschneebergite $BiNi_2(AsO_4)_2[(H_2O)(OH)]$

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 (-). α (calc.) = 1.92 β = 1.95(1) γ = 1.97(2) 2V(meas.) = 77(5)°
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) β = 115.00(1)° 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)

Chemistry:

	(1)	(2)
CaO	2.68	2.55
NiO	14.75	15.10
CoO	7.98	8.08
ZnO	0.09	
PbO	0.35	
Fe_2O_3	2.19	2.15
Bi_2O_3	28.54	28.66
P_2O_5	0.08	
As_2O_5	38.26	38.73
SO_3	<0.05	
H_2O	[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_2O calculated; corresponds to $(Bi_{0.73}Ca_{0.28}Pb_{0.01})_{\Sigma=1.02}(Ni_{1.18}Co_{0.64}Fe_{0.16})_{\Sigma=1.98}(AsO_4)_{1.99}[(H_2O)_{1.10}(OH)_{0.93}]_{\Sigma=2.03}$.
(2) $BiNi_2(AsO_4)_2[(H_2O)(OH)]$.

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 *schneebergit*e.

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).