

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. Crystals, to 0.2 mm, are tabular on {001}, slightly to distinctly elongated along [010], and display 3 pinacoids; in aggregates to 0.3 mm.

Physical Properties: *Cleavage:* Good on {001}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 4.5 D(meas.) = n.d. D(calc.) = 5.81

Optical Properties: Transparent to translucent. *Color:* Brown, nearly black as crusts.

Streak: Light brown. *Luster:* Adamantine.

Optical Class: Biaxial (-). $\alpha = 2.02(2)$ $\beta(\text{calc.}) = 2.07$ $\gamma = 2.12(2)$ $2V(\text{calc.}) = 65(5)^\circ$

Pleochroism: Strong, X = brown to opaque, Y = yellow, Z = pale yellow. *Orientation:* $X \approx [010]$; for crystals lying on (001), X' show an oblique extinction of $\sim 7^\circ$ relative to [010].

Cell Data: *Space Group:* $P\bar{1}$. $a = 4.556(1)$ $b = 6.153(2)$ $c = 8.984(2)$ $\alpha = 95.43(2)^\circ$
 $\beta = 99.22(2)^\circ$ $\gamma = 92.95(3)^\circ$ $Z = \frac{1}{2}$

X-ray Powder Pattern: Guldener Falk mine, near Schneeberg-Neustädtel, Saxony, Germany. 3.542 (100), 3.766 (90), 2.913 (81), 3.505 (62), 2.798 (49), 8.827 (44), 2.668 (39)

Chemistry:	(1)	(2)
Bi_2O_3	52.58	53.35
PbO	0.08	
CaO	0.15	
Fe_2O_3	13.92	18.28
Al_2O_3	0.29	
CoO	3.35	
NiO	0.34	
ZnO	0.09	
CuO	0.07	
As_2O_5	26.82	26.31
P_2O_5	0.23	
H_2O	[2.56]	2.06
Total	100.48	100.00

(1) Guldener Falk mine, near Schneeberg-Neustädtel, Saxony, Germany; average of 13 electron microprobe analyses supplemented by Mössbauer and IR spectroscopy, H_2O calculated from idealized empirical formula; corresponds to $(\text{Bi}_{1.94}\text{Ca}_{0.02})_{\Sigma=1.96}\text{Fe}_{1.00}(\text{Fe}_{0.50}\text{Co}_{0.38}\text{Ni}_{0.04}\text{Al}_{0.05}\text{Zn}_{0.01}\text{Cu}_{0.01})_{\Sigma=0.99}[(\text{OH})_{2.44}\text{O}_{1.40}]_{\Sigma=3.84}[(\text{AsO}_4)_{2.01}(\text{PO}_4)_{0.03}]_{\Sigma=2.04}$. (2) $\text{Bi}_2\text{Fe}^{3+}\text{Fe}^{3+}\text{O}_2(\text{OH})_2(\text{AsO}_4)_2$.

Polymorphism & Series: Forms a series with cobaltneustädtelite.

Mineral Group: Medenbachite group.

Occurrence: In vugs in quartz collected on mining waste piles.

Association: Cobaltneustädtelite, quartz, preisingerite, "limonite"/goethite, mixite, zeunerite, bismutite, bismutoferrite.

Distribution: Studied material from the dumps of the Guldener Falk mine, near Schneeberg-Neustädtel, Saxony, Germany. Other mines with confirmed occurrence in the same district are Siebenschleken, Junge Kalbe, Friedefürst, and Peter und Paul. Also, from the Friedrich-Wilhelm adit, Friedensgruber vein, near Lichtenberg, Bavaria, Germany.

Name: For the locality, Schneeberg-*Neustädtel*, near where the studied samples were collected.

Type Material: State Museum for Geology and Mineralogy, Dresden, Germany (18328).

References: (1) Krause, W., H.-J. Bernhardt, C. McCammon, and H. Effenberger (2002) Neustädtelite and cobaltneustädtelite, the Fe^{3+} - and Co^{2+} -analogues of medenbachite. *Amer. Mineral.*, 87(5-6), 726-738.