

# Medenbachite

# $\text{Bi}_2\text{Fe}^{3+}(\text{Cu}, \text{Fe}^{2+})(\text{O}, \text{OH})_2(\text{AsO}_4)_2(\text{OH})_2$

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**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . As thin tabular crystals, to 2 mm, flattened on  $\{\bar{1}01\}$  and elongated along [111]; forms include  $\{001\}$ ,  $\{\bar{1}01\}$ ,  $\{101\}$ ,  $\{\bar{1}10\}$ ,  $\{0\bar{1}1\}$ ,  $\{13\bar{1}\}$ ; typically aggregated in parallel  $\{\bar{1}01\}$  growths.

**Physical Properties:** *Fracture:* Conchoidal. Hardness = 4.5 VHN = 420 (25 g load).  
D(meas.) = n.d. D(calc.) = 5.90

**Optical Properties:** Transparent to translucent. *Color:* Yellow to yellow-brown.  
*Luster:* Vitreous to adamantine.

*Optical Class:* Biaxial (-). *Orientation:* X ( $-14^\circ, 74^\circ$ ); Y ( $-117^\circ, 52^\circ$ ); Z ( $95^\circ, 43^\circ$ ) [using  $(\phi, \rho)$ ].  
*Dispersion:*  $r > v$ .  $\alpha = 2.03(2)$   $\beta = [2.09]$   $\gamma = 2.10(2)$   $2V(\text{meas.}) = 43(3)^\circ$

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 4.570(1)$   $b = 6.162(1)$   $c = 8.993(1)$   $\alpha = 94.56(1)^\circ$   
 $\beta = 99.69(1)^\circ$   $\gamma = 94.28(1)^\circ$   $Z = 1$

**X-ray Powder Pattern:** Reichenbach, Germany.

3.749 (100), 3.596 (77), 2.903 (69), 8.823 (62), 3.468 (58), 2.685 (48), 5.264 (44)

## Chemistry:

	(1)
As <sub>2</sub> O <sub>5</sub>	25.32
Bi <sub>2</sub> O <sub>3</sub>	53.36
Fe <sub>2</sub> O <sub>3</sub>	8.99
FeO	1.00
CuO	7.85
H <sub>2</sub> O	[3.07]
Total	[99.59]

(1) Reichenbach, Germany; by electron microprobe, average of 16 analyses,  $\text{Fe}^{2+}:\text{Fe}^{3+}$  estimated from microchemical test and requirements of site occupancy,  $(\text{OH})^{1-}$  and absence of  $\text{H}_2\text{O}$  confirmed by IR and apportioned for charge balance; corresponding to  $\text{Bi}_{2.04}\text{Fe}_{1.00}^{3+}(\text{Cu}_{0.88}\text{Fe}_{0.12}^{2+})_{\Sigma=1.00}\text{O}_{1.11}(\text{AsO}_4)_{1.96}(\text{OH})_{3.03}$ .

**Occurrence:** A very rare secondary mineral in a weathered polymetallic sulfide vein.

**Association:** Mixite, preisingerite, alunite, goethite, reichenbachite, malachite, quartz.

**Distribution:** From [the Borstein quarry,] about one km east of Reichenbach, near Bensheim, Hesse, Germany.

**Name:** Honors Olaf Medenbach (1949–), mineralogist, Ruhr University, Bochum, Germany.

**Type Material:** Institute for Mineralogy, Ruhr University, Bochum, Germany, 8.0.137, 8.0.376.

**References:** (1) Krause, W., H.-J. Bernhardt, W. Gebert, H. Graetsch, K. Belendorff, and K. Petitjean (1996) Medenbachite,  $\text{Bi}_2\text{Fe}(\text{Cu}, \text{Fe})(\text{O}, \text{OH})_2(\text{OH})_2(\text{AsO}_4)_2$ , a new mineral species: its description and crystal structure. *Amer. Mineral.*, 81, 505–512.