

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 (ϕ, ρ)].
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 ₂ O ₅	25.32
Bi ₂ O ₃	53.36
Fe ₂ O ₃	8.99
FeO	1.00
CuO	7.85
H ₂ 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 H_2O 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.