

# Rauenthalite

# $\text{Ca}_3(\text{AsO}_4)_2 \cdot 10\text{H}_2\text{O}$

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**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . Euhedral crystals, elongated along [001], to 0.5 mm, isolated or in spherulitic aggregates.

**Physical Properties:** Hardness = n.d.  $D(\text{meas.}) = 2.36$   $D(\text{calc.}) = 2.362$

**Optical Properties:** Semitransparent. *Color:* Snow-white to colorless.

*Optical Class:* Biaxial (+). *Orientation:*  $Y \wedge c = 5^\circ\text{--}10^\circ$ .  $\alpha = [1.540]\text{--}1.546$   $\beta = 1.552(2)$   
 $\gamma = 1.570\text{--}1.576$   $2V(\text{meas.}) = 85(2)^\circ$

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 12.564(8)$   $b = 12.169(7)$   $c = 6.195(4)$   $\alpha = 89.09(3)^\circ$   
 $\beta = 79.69(3)^\circ$   $\gamma = 118.58(4)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Sainte-Marie-aux-Mines, France; close to phaunouxite.  
10.8 (FFF), 3.36 (FF), 2.44 (F), 6.2 (mF), 2.58 (mF), 2.06 (mF), 3.79 (f)

## Chemistry:

	(1)	(2)
As <sub>2</sub> O <sub>5</sub>	39.94	39.75
MgO	0.00	
CaO	28.92	29.09
H <sub>2</sub> O	31.04	31.16
Total	99.90	100.00

(1) Sainte-Marie-aux-Mines, France; average of two analyses, H<sub>2</sub>O by TGA; corresponds to  $\text{Ca}_{2.98}(\text{AsO}_4)_{2.00} \cdot 9.9\text{H}_2\text{O}$ . (2)  $\text{Ca}_3(\text{AsO}_4)_2 \cdot 10\text{H}_2\text{O}$ .

**Occurrence:** A post-mine low-temperature reaction product of carbonate gangue with arsenical solutions derived from arsenic (Sainte-Marie-aux-Mines, France).

**Association:** Phaunouxite, picropharmacolite, pharmacolite, sainfeldite, ferrarisite, löllingite, calcite, aragonite (Sainte-Marie-aux-Mines, France); picropharmacolite, lavendulan, cobaltian hörnesite, guérinite, roselite, gypsum (Anton mine, Germany).

**Distribution:** From the Gabe-Gottes mine, Sainte-Marie-aux-Mines, Haut-Rhin, and at the Salsigne mine, 15 km north of Carcassonne, Aude, France. In the Svatá Anna uranium deposit, Planá, near Mariánské Lázně (Marienbad), and Jáchymov (Joachimsthal), Czech Republic. In Germany, at the Anton mine, Heubachtal, near Schiltach, and from Wittichen, Black Forest; at St. Andreasberg, Harz Mountains; in the Bauhaus district, Richelsdorf Mountains, Hesse; from Schneeberg, Saxony. In the Muckross mine, Co. Kerry, Ireland. At the Getchell mine, Potosi district, Humboldt Co., Nevada, USA.

**Name:** For the Rauenthal vein system, on which Sainte-Marie-aux-Mines, France, is located.

**Type Material:** National School of Mines, Paris, France.

**References:** (1) Pierrot, R. (1964) Contribution à la minéralogie des arséniate calciques et calcomagnésiens naturels. Bull. Minéral., 87, 169–211, esp. 177–180 (in French). (2) (1965) Amer. Mineral., 50, 805–806 (abs. ref. 1). (3) Catti, M. and G. Ivaldi (1983) On the topotactic dehydration  $\text{Ca}_3(\text{AsO}_4)_2 \cdot 11\text{H}_2\text{O}$  (phaunouxite)  $\rightarrow$   $\text{Ca}_3(\text{AsO}_4)_2 \cdot 10\text{H}_2\text{O}$  (rauenthalite) and structures of both minerals. Acta Cryst., 39, 4–10. (4) Walenta, K. (1972) Die Sekundärminerale der Co-Ni-Ag-Bi-U-Erzgänge im Gebiet von Wittichen im mittleren Schwarzwald. Aufschluss, 23, 279–329, esp. 311 (in German).