

## Ettringite

## $\text{Ca}_6\text{Al}_2(\text{SO}_4)_3(\text{OH})_{12}\cdot 26\text{H}_2\text{O}$

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**Crystal Data:** Hexagonal. *Point Group:*  $3m$ . Crystals prismatic and striated along [0001], to 20 cm, commonly unterminated, rarely dipyrmidal  $\{10\bar{1}2\}$ ; fibrous to cottonlike.

**Physical Properties:** *Cleavage:* On  $\{10\bar{1}0\}$ , perfect. Hardness = 2–2.5  $D(\text{meas.}) = 1.77$   $D(\text{calc.}) = 1.77$  Partially soluble in  $\text{H}_2\text{O}$ ; partially dehydrates on exposure, becoming opaque.

**Optical Properties:** Transparent to opaque. *Color:* Colorless, pale yellow, milky white; colorless in transmitted light. *Luster:* Vitreous.

*Optical Class:* Uniaxial (–), changing to uniaxial (+) on dehydration.  $\omega = 1.464$   $\epsilon = 1.458$

**Cell Data:** *Space Group:*  $P31c$ .  $a = 11.23$   $c = 21.44$   $Z = 2$

**X-ray Powder Pattern:** Synthetic.

9.73 (100), 5.61 (80), 3.88 (50), 2.564 (45), 2.209 (45), 2.773 (40), 4.69 (35)

**Chemistry:**

	(1)	(2)
$\text{SO}_3$	18.8	19.14
$\text{CO}_2$	0.8	
$\text{Al}_2\text{O}_3$	7.0	8.12
$\text{CaO}$	26.6	26.81
$\text{H}_2\text{O}$	46.3	45.93
Total	99.5	100.00

(1) Scawt Hill, Ireland. (2)  $\text{Ca}_6\text{Al}_2(\text{SO}_4)_3(\text{OH})_{12}\cdot 26\text{H}_2\text{O}$ .

**Mineral Group:** Ettringite group.

**Occurrence:** In metamorphosed limestone near igneous contacts or in xenoliths; as weathering crusts on larnite rocks (Hatrurim Formation, Israel).

**Association:** Portlandite, afwillite, hydrocalumite (Scawt Hill, Ireland); afwillite, hydrocalumite, mayenite, gypsum (Hatrurim Formation, Israel).

**Distribution:** In Germany, from the Ettringer-Bellerberg volcano, near Mayen, and Schellkopf near Brenk, Eifel district; in the Zeilberg quarry, Maroldsweisach, Bavaria. At Boisséjour, near Clermont-Ferrand, Puy-de-Dôme, France. From Scawt Hill, near Larne, Co. Antrim, Ireland. In the Hatrurim Formation, Israel. As large crystals from the N'Chwaning mine, Kuruman district, Cape Province, South Africa. In the USA, at the Crestmore quarry, Riverside Co., California; in the Lucky Cuss mine, Tombstone, Cochise Co., Arizona.

**Name:** For the occurrence near Ettringen, Germany.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 589–590. (2) Gross, S. (1977) The mineralogy of the Hatrurim Formation, Israel. *Geol. Sur. Israel Bull.* 70, 25–26. (3) Moore, A.E. and H.F.W. Taylor (1970) Crystal structure of ettringite. *Acta Cryst.*, 26, 386–393. (4) (1958) *NBS Circ.* 539, 8, 3–4.