Magnesioaubertite $(Mg,Cu)Al(SO_4)_2Cl{\cdot}14H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Crystals, to 100 μm, in aggregates and crusts.

Physical Properties: *Cleavage:* On {010}, good. Hardness = 2–3 D(meas.) = 1.80(3) D(calc.) = 1.78 Soluble in H_2O.

Optical Properties: Transparent. *Color:* Sky-blue. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Pleochroism:* X = colorless; $Y = Z$ = pale blue. *Orientation:* $X \wedge (010) = 17(1)°$. *Dispersion:* $r > v$. $\alpha = 1.466(1)$ $\beta = 1.481(1)$ $\gamma = 1.488(1)$ 2V(meas.) = 112° 2V(calc.) = 114°

Cell Data: *Space Group:* $P\overline{1}$. $a = 6.31(1)$ $b = 13.20(2)$ $c = 6.29(1)$ $\alpha = 91.74°$ $\beta = 94.55°$ $\gamma = 82.62°$ $Z = 1$

X-ray Powder Pattern: Vulcano, Italy.
4.50 (100), 3.97 (80), 5.61 (70), 4.25 (60), 3.68 (60), 6.26 (50), 4.81 (50)

Chemistry:

	(1)	(2)
SO_3	28.25	33.16
Al_2O_3	13.91	10.96
CuO	5.50	4.44
ZnO		0.01
MgO	3.38	3.08
F		0.14
Cl	7.6	3.90
H_2O	44.0	43.97
$-O = (F,Cl)_2$	1.7	0.94
Total	100.9	98.72

(1) Vulcano, Italy; corresponds to $(Mg_{0.44}Cu_{0.37}Al_{0.19})_{\Sigma=1.00}Al_{1.25}(S_{0.93}O_4)_2Cl_{1.13}{\cdot}12.92H_2O$.
(2) Do.; calculated from an elemental analysis, corresponds to $(Mg_{0.43}Cu_{0.32}Al_{0.20})_{\Sigma=0.95}Al_{1.00}(SO_4)_{2.31}(Cl_{0.61}F_{0.04})_{\Sigma=0.65}{\cdot}13.62H_2O$.

Occurrence: A rare secondary mineral formed by the reaction of volcanic gases and aluminum-bearing rocks.

Association: Alunogen, pickeringite, metasideronatrite, sulfur, tamarugite, aluminocopiapite, metavoltine.

Distribution: From the Grotta de Faraglione and along the Baia de Levante, Vulcano, Lipari Islands, Italy.

Name: For its content of *magnesium* greater than copper, and relation to *aubertite*.

Type Material: University of Bochum, Bochum, Germany; National Museum of Natural History, Washington, D.C., USA, 168433.

References: (1) Gebhard, G., O. Medenbach, and W. Gebert (1988) Magnesioaubertit, $(Mg,Cu)Al(SO_4)_2Cl{\cdot}14H_2O$, ein neues Chlorsulfat von Vulcano, Liparische Inseln. Aufschluss, 39, 97–102 (in German). (2) (1990) Amer. Mineral., 75, 1433 (abs. ref. 1). (3) Garavelli, A., M.F. Grasso, and F. Vurro (1996) Mineral occurrence and depositional processes at Baia di Levante area (Vulcano Island, Italy). Miner. Petrogr. Acta, 39, 251–261.