

# Goudeyite

# (Al, Y)Cu<sub>6</sub>(AsO<sub>4</sub>)<sub>3</sub>(OH)<sub>6</sub>•3H<sub>2</sub>O

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**Crystal Data:** Hexagonal. *Point Group:* 6/m or 6 (probable). Crystals are hairlike hexagonal prisms, elongated along [0001], to 1 cm, in tufted groups and cross-fiber veinlets.

**Physical Properties:** Hardness = 3–4 D(meas.) = 3.50(3) D(calc.) = [3.49]

**Optical Properties:** Semitransparent. *Color:* Yellow-green, blue-green.

*Optical Class:* Uniaxial (+). *Pleochroism:* O = pale yellow-green; E = green.

*Absorption:* O < E.  $\omega = 1.704\text{--}1.705$   $\epsilon = 1.765\text{--}1.772$

**Cell Data:** *Space Group:* [P6<sub>3</sub>/m or P6<sub>3</sub>] (by analogy to mixite). a = 13.472(1)  
c = 5.902(4) Z = [2]

**X-ray Powder Pattern:** Majuba Hill, Nevada, USA; identical to mixite.  
11.63 (100), 2.920 (50), 3.235 (46), 2.546 (46), 4.41 (43), 2.677 (42), 3.367 (20)

## Chemistry:

	(1)
P <sub>2</sub> O <sub>5</sub>	4.55
As <sub>2</sub> O <sub>5</sub>	27.85
Al <sub>2</sub> O <sub>3</sub>	4.00
Y <sub>2</sub> O <sub>3</sub>	3.40
CuO	46.77
CaO	1.37
H <sub>2</sub> O	11.00
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Total	98.94

(1) Majuba Hill, Nevada, USA; by electron microprobe, average of five analyses, H<sub>2</sub>O by weight loss to 600 °C; corresponds to (Al<sub>0.77</sub>Y<sub>0.29</sub>)<sub>Σ=1.06</sub>(Cu<sub>5.80</sub>Ca<sub>0.24</sub>)<sub>Σ=6.04</sub>[(AsO<sub>4</sub>)<sub>2.40</sub>(PO<sub>4</sub>)<sub>0.63</sub>]<sub>Σ=3.03</sub>(OH)<sub>6.17</sub>•2.95H<sub>2</sub>O.

**Mineral Group:** Mixite group.

**Occurrence:** A rare secondary mineral in a hydrothermal Cu–Sn orebody in rhyolite porphyries and breccias (Majuba Hill, Nevada, USA).

**Association:** Olivenite, clinoclase, cornwallite, strashimirite, scorodite, pharmacosiderite, arthurite, metazeunerite, chalcantinite, chrysocolla, spangolite, chalcophyllite, malachite, azurite, brochantite (Majuba Hill, Nevada, USA); malachite, montmorillonite (Chessy, France).

**Distribution:** From the Majuba Hill mine, Antelope district, Pershing Co., Nevada, USA. In the Virneberg mine, near Rheinbreitbach, Rhineland-Palatinate, Germany. At Chessy, near Lyon, Rhône, France. Large crystals from Tsumeb, Namibia.

**Name:** To honor Hatfield Goudey (1906–1985), American economic geologist, mineral collector and dealer in microscopic specimens, San Mateo, California, USA, who contributed to knowledge of the type locality.

**Type Material:** University of California, Santa Barbara, California, 8091; National Museum of Natural History, Washington, D.C., USA, 144005.

**References:** (1) Wise, W.S. (1978) Parnauite and goudeyite, two new copper arsenate minerals from the Majuba Hill mine, Pershing County, Nevada. *Amer. Mineral.*, 63, 704–708. (2) Sarp, H., J. Bertrand, and J. Deferne (1981) Présence de goudeyite, Cu<sub>6</sub>Al(AsO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>•3H<sub>2</sub>O [sic], dans des échantillons provenant de l'ancienne mine de Chessy (Rhône, France). *Schweiz. Mineral. Petrog. Mitt.*, 61, 173–176 (in French with English abs.).