

Goudeyite

(Al, Y)Cu₆(AsO₄)₃(OH)₆•3H₂O

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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:* [P6₃/m or P6₃] (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 ₂ O ₅	4.55
As ₂ O ₅	27.85
Al ₂ O ₃	4.00
Y ₂ O ₃	3.40
CuO	46.77
CaO	1.37
H ₂ O	11.00
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Total	98.94

(1) Majuba Hill, Nevada, USA; by electron microprobe, average of five analyses, H₂O by weight loss to 600 °C; corresponds to (Al_{0.77}Y_{0.29})_{Σ=1.06}(Cu_{5.80}Ca_{0.24})_{Σ=6.04}[(AsO₄)_{2.40}(PO₄)_{0.63}]_{Σ=3.03}(OH)_{6.17}•2.95H₂O.

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, Cu₆Al(AsO₄)₂(OH)₆•3H₂O [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.).