

Arthurite



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Crystal Data: Monoclinic. *Point Group:* $2/m$. As prismatic to acicular crystals, to 5 mm; usually as spherical aggregates and thin crusts.

Physical Properties: Hardness = n.d. $D(\text{meas.}) = \sim 3.2$ $D(\text{calc.}) = 3.29$

Optical Properties: Transparent to translucent. *Color:* Apple-green to bluish green; pale olive-green in transmitted light.

Optical Class: Biaxial (+), may be biaxial (-). *Pleochroism:* $X =$ colorless to pale green; $Y =$ gray-green; $Z =$ olive-green. *Orientation:* $Y = b$; $Z \wedge c = 10^\circ$. *Absorption:* $Z > Y > X$. $\alpha = 1.736$ $\beta = 1.767$ $\gamma = 1.796$ $2V(\text{meas.}) = \sim 90^\circ$

Cell Data: *Space Group:* $P2_1/c$. $a = 10.189(2)$ $b = 9.649(2)$ $c = 5.598(1)$
 $\beta = 92.16(2)^\circ$ $Z = 2$

X-ray Powder Pattern: Hingston Down Consols mine, England.
4.28 (vvs), 4.81 (vvs), 6.97 (vvs), 10.08 (vs), 2.801 (vs), 2.912 (s), 3.44 (ms)

Chemistry:

	(1)	(2)
SO ₃	[3.2]	3.2
P ₂ O ₅	[5.5]	5.5
As ₂ O ₅	31.3	36.5
Fe ₂ O ₃	29.7	27.6
CuO	15.3	17.5
H ₂ O	15.0	[9.7]
Total	[100.0]	[100.0]

(1) Hingston Down Consols mine, England; H₂O by loss on ignition; after deduction of quartz 27.4%, and addition of SO₃ and P₂O₅ from analysis (2); then corresponds to Cu_{1.02}Fe_{1.98}[(As_{0.69}P_{0.20}S_{0.11})_{Σ=1.00}O₄]₂(O, OH)₂ · 4H₂O. (2) Do.; by electron microprobe, H₂O by difference.

Mineral Group: Arthurite group.

Occurrence: A rare secondary mineral in the oxidized zone of some copper deposits, formed by alteration of arsenopyrite or enargite.

Association: Pharmacosiderite, scorodite, conichalcite, chenevixite, chalcophyllite, brochantite, quartz.

Distribution: In England, in Cornwall, from the Hingston Down Consols mine, Calstock, the Gunheath china clay pit, St. Austell, and the Cligga Head mine, Perranzabuloe. From the Clara mine, near Oberwolfach, Black Forest, Germany. In the Bendada pegmatite, near Guarda, Portugal. From Rodalquilar, Almería Province, Spain. At the Potrerillos mine, Atacama, Chile. Fine crystals from the Majuba Hill mine, Antelope district, Pershing Co., Nevada; at the Black Pine mine, near Philipsburg, Granite Co., Montana; from Gold Hill, Tooele Co., Utah, USA. In the Dome Rock copper mine, about 40 km northwest of Mingary, South Australia.

Name: Honors Sir Arthur Edward Ian Montagu Russell (1878–1964) and Arthur William Gerald Kingsbury (1906–1968) for their substantial contributions to British mineralogy.

Type Material: The Natural History Museum, London, England, 1964,74–75 and 1964,80.

References: (1) Davis, R.J. and M.H. Hey (1964) Arthurite, a new copper-iron arsenate from Cornwall. *Mineral. Mag.*, 33, 937–941. (2) (1965) *Amer. Mineral.*, 50, 522 (abs. ref. 1). (3) Davis, R.J. and M.H. Hey (1969) The cell-contents of arthurite redetermined. *Mineral. Mag.*, 37, 520–521. (4) Keller, P. and H. Hess (1978) Die kristallstruktur von Arthurit, CuFe₂³⁺[(H₂O)₄](OH)₂[(AsO₄)₂]. *Neues Jahrb. Mineral., Abh.*, 133, 291–302 (in German with English abs.).

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