Mcbirneyite $Cu_3(VO_4)_2$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. As anhedral crystals, to 200 μm.

Physical Properties: Hardness = n.d. D(meas.) = n.d. D(calc.) = 4.50

Optical Properties: Opaque. *Color:* Black; medium gray in reflected light.
Optical Class: [Biaxial.] *Luster:* Metallic.
R: (470) 18.5, (546) 17.5, (589) 18.7, (650) 20.6

Cell Data: *Space Group:* $P\overline{1}$. $a = 5.3418(9)$ $b = 6.5100(8)$ $c = 5.1798(7)$ $\alpha = 88.61(1)°$ $\beta = 68.11(1)°$ $\gamma = 69.22(1)°$ Z = 1

X-ray Powder Pattern: Izalco Volcano, El Salvador.
3.12 (100), 2.82 (100), 4.01 (80), 2.641 (80), 2.428 (80), 4.25 (60), 2.572 (60)

Chemistry:

	(1)	(2)
V_2O_5	41.44	43.25
CuO	56.82	56.75
Total	98.26	100.00

(1) Izalco Volcano, El Salvador; by electron microprobe, average of six analyses of three crystals; corresponds to $Cu_{3.08}(VO_4)_{1.97}$. (2) $Cu_3(VO_4)_2$.

Occurrence: Very rare in the sulfate zone of sublimates around a fumarole in a composite volcano, likely formed between 100 °C–200 °C.

Association: Fingerite, thenardite, euchlorine.

Distribution: From fumarole "Y", Izalco Volcano, El Salvador.

Name: Honors Professor Alexander Robert McBirney (1924–), Volcanologist, University of Oregon, Corvallis, Oregon, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 163183.

References: (1) Hughes, J.M., B.S. Christian, L.W. Finger, and L.L. Malinconico (1987) Mcbirneyite, $Cu_3(VO_4)_2$, a new sublimate mineral from the fumaroles of Izalco Volcano, El Salvador. J. Volcanology and Geothermal Research, 33, 183–190. (2) (1988) Amer. Mineral., 73, 1495 (abs. ref. 1).