Nyholmite $Cd_3Zn_2(AsO_3OH)_2(AsO_4)_2 \cdot 4H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. Crystals, fibrous to bladed, to 0.2 mm; as globules and tufted aggregates, to 1 mm.

Physical Properties: *Cleavage*: Perfect on {001}. *Fracture*: Uneven.
Tenacity: Brittle. Hardness = 3-3.5 D(meas.) = n.d. D(calc.) = 4.42 (ideal formula)

Optical Properties: Transparent to translucent. *Color*: Colorless crystals, white in aggregates.
Streak: White. *Luster*: Vitreous.
Optical Class: n.d. $\beta \sim 1.70$

Cell Data: *Space Group*: *C2/c*. $a = 18.062(4)$ $b = 9.341(2)$ $c = 9.844(2)$ $\beta = 96.17(3)°$
Z = 4

X-ray Powder Pattern: Broken Hill, New South Wales, Australia.
3.234 (100), 8.283 (85), 3.079 (65), 2.976 (45), 8.985 (30), 6.169 (25), 4.878 (25)

Chemistry:

	(1)	(2)
P_2O_5	6.29	
As_2O_5	34.55	41.88
Al_2O_3	0.20	
MnO	3.59	
CaO	0.16	
ZnO	9.72	14.83
CuO	3.39	
CdO	34.58	35.09
PbO	0.37	
H_2O_{calc}	8.21	8.21
Total	101.06	100.00

(1) Broken Hill, New South Wales, Australia, average of 14 electron microprobe analyses; corresponding to $Cd_{2.80}Zn_{1.24}Mn_{0.53}Cu_{0.44}Al_{0.04}Ca_{0.03}Pb_{0.02}[(AsO_4)_{3.13}(PO_4)_{0.92}]_{\Sigma=4.05}\ H_{1.91} \cdot 3.79H_2O$.
(2) $Cd_3Zn_2(AsO_3OH)_2(AsO_4)_2 \cdot 4H_2O$.

Occurrence: A late-stage secondary mineral in the weathering zone of a Cd-Zn arsenate deposit.

Association: Goldquarryite, lavendulan-sampleite, scorodite-strengite, gypsum.

Distribution: Block 14 Opencut, Broken Hill, New South Wales, Australia.

Name: Honors Sir Ronald Sydney Nyholm (1917–1971), born at Broken Hill, New South Wales, and Chair and Professor of Chemistry, University College, London, from 1955–1971.

Type Material: South Australian Museum, Adelaide, South Australia (catalog no. G32511).

References: (1) Elliott, P., P. Turner, P. Jensen, U. Kolitsch, and A. Pring (2009) Description and crystal structure of nyholmite, a new mineral related to hureaulite, from Broken Hill, New South Wales, Australia. Mineral. Mag., 73, 723–735. (2) (2010) Amer. Mineral., 95, 1360 (abs. ref. 1).