

Crystal Data: Monoclinic or triclinic, pseudocubic. *Point Group:* n.d. Crystals several mm on a side, showing zonal growth patterns.

Physical Properties: *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5–5.5 VHN = Slightly higher than ullmannite. D(meas.) = 6.76(3) D(calc.) = n.d.

Optical Properties: Opaque. *Color:* Steel-gray. *Luster:* Metallic.
R₁–R₂: n.d.

Cell Data: *Space Group:* n.d. *a* = 5.86 *Z* = 4

X-ray Powder Pattern: Broken Hill, Australia. (ICDD 26-1106).
2.621 (100), 2.390 (70), 1.767 (60), 1.565 (50), 1.625 (40), 1.278 (40), 1.087 (40)

| Chemistry: | (1) | (2) | (3) |
|-------------------|-------|------|------|
| Co | 13.88 | 20.6 | 23.2 |
| Ni | 13.41 | 6.9 | 3.8 |
| Fe | trace | 0.2 | 0.4 |
| Sb | 56.78 | 55.9 | 54.7 |
| As | | 0.7 | 1.6 |
| S | 15.78 | 15.1 | 14.6 |
| Total | 99.85 | 99.4 | 98.3 |

(1) Broken Hill, Australia. (2–3) Do.; by electron microprobe.

Polymorphism & Series: Forms a series with ullmannite.

Mineral Group: Cobaltite group.

Occurrence: In calcite–siderite veins.

Association: Dyscrasite, costibite, calcite, siderite.

Distribution: In the Consols lode, Broken Hill, Willyama Township, New South Wales, Australia.

Name: For the locality in Willyama Township, New South Wales, Australia.

Type Material: National Museum of Natural History, Washington, D.C., USA, R849A.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 301–302. (2) Cabri, L.J., D.C. Harris, J.M. Stewart, and J.F. Rowland (1970) Willyamite redefined. Proc. Australasian Inst. Mining Met., 233, 95–100. (3) (1971) Amer. Mineral., 56, 361 (abs. ref. 2).