Damaraite $Pb_4O_3Cl_2$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$ or $mm2$. As tiny flakes and subhedral grains, to 150 μm, in host minerals.

Physical Properties: *Cleavage:* {010}, good. *Fracture:* Irregular to subconchoidal. *Tenacity:* Brittle. Hardness = ∼3 VHN = 145–154, 148 average (50 g load). D(meas.) = n.d. D(calc.) = 7.84

Optical Properties: Transparent. *Color:* Colorless; in reflected light, gray with white to colorless internal reflections. *Streak:* White. *Luster:* Adamantine.
Optical Class: Biaxial; near uniaxial (+). *Pleochroism:* Very weak; gray to slightly bluish gray. *Anisotropism:* Weak. *Bireflectance:* Weak.
R_1–R_2: (400) 19.1–20.8, (420) 18.6–23.1, (440) 17.9–21.1, (460) 17.4–19.4, (480) 16.9–18.5, (500) 16.6–17.9, (520) 16.2–17.4, (540) 16.0–17.0, (560) 15.8–16.7, (580) 15.6–16.5, (600) 15.5–16.3, (620) 15.4–16.2, (640) 15.2–16.0, (660) 15.2–15.9, (680) 15.1–15.8, (700) 15.0–15.6

Cell Data: *Space Group:* $Pmam$, $P2_1am$, or $Pma2$. a = 15.104(1) b = 6.891(1) c = 5.806(1) Z = 3

X-ray Powder Pattern: Kombat mine, Namibia.
2.902 (10), 2.766 (10), 2.877 (9), 3.164 (6), 3.135 (6), 1.747 (6), 3.824 (5)

Chemistry:

	(1)	(2)
Pb	87.04	87.45
O	[5.08]	5.07
Cl	7.29	7.48
Total	[99.41]	100.00

(1) Kombat mine, Namibia; by electron microprobe, average of four analyses; corresponds to $Pb_{4.02}O_{3.03}Cl_{1.97}$. (2) $Pb_4O_3Cl_2$.

Occurrence: From a late-stage vein cutting a banded manganese ore lens in Cu–Pb–Ag ores formed by hydrothermal and metasomatic replacement of dolostones (Kombat mine, Namibia).

Association: Jacobsite, hausmannite, hematophanite, defernite, crednerite, asisite, andradite, vesuvianite, copper, calcite, barite (Kombat mine, Namibia).

Distribution: From the Kombat Cu–Pb–Ag mine, 49 km south of Tsumeb, Namibia. At Laurium, Greece, in slag. Found in the Elura Zn–Pb–Ag deposit, 43 km northeast of Cobar, New South Wales, Australia.

Name: For the Damara dolostone sequence, which hosts the Kombat deposit.

Type Material: The Natural History Museum, London, England, 1988,256–257; Institute for Mineralogy and Crystal Chemistry, University of Stuttgart, Stuttgart, Germany.

References: (1) Criddle, A.J., P. Keller, C.J. Stanley, and J. Innes (1990) Damaraite, a new lead oxychloride mineral from the Kombat mine, Namibia (South West Africa). Mineral. Mag., 54, 593–598. (2) (1992) Amer. Mineral., 77, 671 (abs. ref. 1).