Redledgeite $BaTi_6Cr_2^{3+}O_{16}\cdot H_2O$

Crystal Data: Tetragonal, or monoclinic, pseudotetragonal. *Point Group:* $4/m$ or $2/m$. As dipyramidal crystals, to 2 mm; also finely fibrous.

Physical Properties: Hardness = 6.5 D(meas.) = 3.72 D(calc.) = 4.413

Optical Properties: Opaque, transparent on thin edges or in fibrous crystals. *Color:* Black or pale green to dark yellow-green; in reflected light, may have vivid green internal reflections when iron-free. *Luster:* Adamantine.
Optical Class: Uniaxial or biaxial.
R_1–R_2: n.d.

Cell Data: *Space Group:* $I4_1/m$, with $a = 14.320(2)$ $c = 5.893(1)$ Z = 4, or
Space Group: $I2/m$, with $a = 10.129(2)$ $b = 2.951(1)$ $c = 10.135(1)$ $\beta = 90.05°$ Z = 1

X-ray Powder Pattern: Red Ledge mine, California, USA; close to mannardite.
3.195 (100), 2.470 (60), 1.583 (60), 3.570 (50), 1.885 (50), 1.393 (50), 2.217 (40)

Chemistry:

	(1)	(2)	(3)
TiO_2	59.7	58.6	59.72
Fe_2O_3	0.9	1.0	
V_2O_3	0.4	0.7	
Cr_2O_3	17.4	17.0	18.94
BaO	20.2	20.8	19.10
H_2O	[2.1]		2.24
Total	[100.7]	98.1	100.00

(1) Red Ledge mine, California, USA; by electron microprobe, Ba + H_2O calculated = 2; corresponds to $Ba_{1.06}(Ti_{6.00}Cr_{1.84}Fe_{0.09}V_{0.05})_{\Sigma=7.98}O_{16}\cdot 0.94H_2O$. (2) Do.; by electron microprobe, average of 21 analyses; corresponds to $Ba_{1.10}(Ti_{5.95}Cr_{1.82}Fe_{0.10}V_{0.08})_{\Sigma=7.95}O_{16}$. (3) $BaTi_6Cr_2^{3+}O_{16}\cdot H_2O$.

Mineral Group: Cryptomelane group.

Occurrence: On chrome ore from a gold deposit.

Association: Chromite, chromian clinochlore, knorringite.

Distribution: In the USA, from the Red Ledge mine, Washington district, Nevada Co., California.

Name: For the Red Ledge mine, California, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 95846; The Natural History Museum, London, England, 1928,336.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 560 [chromrutile]. (2) Strunz, H. (1961) "Chromrutile" von der Red Ledge Mine ist kein Rutil. Redledgeit. Neues Jahrb. Mineral., Monatsh., 107–111 (in German with English abs.). (3) Strunz, H. (1963) Redledgeit, eine TiO_2−Einlagerungsstruktur analog Kryptomelane. Neues Jahrb. Mineral., Monatsh., 116–119 (in German with English abs.). (4) Scott, J.D. and G.R. Peatfield (1986) Mannardite $[Ba\cdot H_2O](Ti_6V_2^{3+})O_{16}$, a new mineral species, and new data on redledgeite. Can. Mineral., 24, 55–66. (5) Szymański, J.T. (1986) The crystal structure of mannardite, a new hydrated cryptomelane group (hollandite) mineral with a doubled short axis. Can. Mineral., 24, 67–78. (6) Gatehouse, B.M., G.C. Jones, A. Pring, and R.F. Symes (1986) The chemistry and structure of redledgeite. Mineral. Mag., 50, 709–715.