Doloresite $H_8V_6^{4+}O_{16}$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Very rarely in crystals, to 0.1 mm; commonly massive, as veinlets, in radiating bands having botryoidal surfaces, or bladed; almost always intimately intermixed with other vanadium oxide minerals, especially montroseite–paramontroseite. *Twinning:* Lamellar, on {100}, nearly universal.

Physical Properties: *Cleavage:* "Flaky". *Fracture:* "Fibrous". Hardness = n.d. D(meas.) = 3.27–3.33 D(calc.) = 3.41

Optical Properties: Opaque, transparent only in thin fragments. *Color:* Chocolate-brown when pure, commonly nearly black, typically with a dark bronzy tarnish; in transmitted light, reddish brown to reddish yellow; in reflected light, gray with color variation along the crystals. *Streak:* Greenish black. *Luster:* Submetallic; sometimes satinlike on cleavage surfaces. *Optical Class:* Biaxial; optical data not determinable, presumably due to lamellar submicroscopic twinning. *Orientation:* Extinction parallel. $n = \sim 1.90$ 2V(meas.) = n.d. *Anisotropism:* Strong.

Cell Data: *Space Group:* $C2/m$. $a = 19.64(6)$ $b = 2.99(1)$ $c = 4.83(2)$ $\beta = 103°55(5)'$ $Z = 1$

X-ray Powder Pattern: Monument No. 2 mine, Arizona, USA.
4.70 (100), 3.83 (50), 2.45 (50), 3.16 (42), 1.933 (25), 1.799 (21), 2.98 (15)

Chemistry:

	(1)	(2)		(1)	(2)
V_2O_5	78.00		$UO_2 + UO_3$	3.88	
V_2O_4		87.35	FeO	3.83	
SiO_2	0.30		MgO	3.98	
Al_2O_3	1.33		Pb	0.07	
As_2O_3	0.30		H_2O^+	6.33	12.65
V_2O_3	1.89		H_2O^-	0.37	
			Total	100.28	100.00

(1) La Sal No. 2 mine, Colorado, USA; estimated about 50% montroseite–paramontroseite.
(2) $H_8V_6O_{16}$.

Occurrence: In relatively unoxidized uranium-vanadium ores; from the cores of black, concretionary masses high in uranium and vanadium, surrounded by tyuyamunite-bearing sandstone (La Sal No. 2 mine, Colorado, USA).

Association: Coffinite, uraninite, clausthalite, montroseite, paramontroseite, vanadium oxides.

Distribution: In the USA, in Colorado, from the La Sal No. 2 mine, Lumsden Canyon, Gateway district, and in the Matchless, Arrowhead, Corvusite, Black Mama, and Lumsden No. 2 mines, Mesa Co.; from the Golden Cycle, J.J., and Peanut mines, Montrose Co. From the Mi Vida mine, San Juan Co., Utah; at a prospect in Valencia Co., New Mexico; in the Monument No. 2 mine, Apache Co., Arizona; and from Carlile, Crook Co., Wyoming. At the Puttapa zinc mine, near Beltana, South Australia. In the Urcal deposit, La Rioja Province, Argentina.

Name: For the Dolores River, southwestern Colorado, USA.

Type Material: n.d.

References: (1) Stern, T.W., L.R. Stieff, H.T. Evans, Jr., and A.M. Sherwood (1957) Doloresite, a new vanadium oxide mineral from the Colorado Plateau. Amer. Mineral., 42, 587–593. (2) Evans, H.T., Jr. and M.E. Mrose (1960) A crystal chemical study of the vanadium oxide minerals, häggite and doloresite. Amer. Mineral., 45, 1144–1166. (3) Théobald, F. (1975) Synthèse de la dolorésite. Bull. Soc. fr. Minéral., 98, 193–194 (in French).