Deerite $(Fe^{2+}, Mn^{2+})_6(Fe^{3+}, Al)_3Si_6O_{20}(OH)_5$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals acicular, lozenge-shaped in cross section, to 1 mm. *Twinning:* Submicroscopic with twin axis [001], pervasive.

Physical Properties: *Cleavage:* Good on {110}. Hardness = n.d. D(meas.) = 3.837 D(calc.) = [3.86]

Optical Properties: Nearly opaque, transparent on thin edges. *Color:* Black. *Optical Class:* Biaxial. *Pleochroism:* Slight; X = dark brown; $Y = Z$ = dark brown-black. *Orientation:* $Z = c$. $\alpha = 1.840(1)$ β = n.d. $\gamma = 1.870(1)$ 2V(meas.) = n.d.

Cell Data: *Space Group:* $P2_1/a$. $a = 10.786(8)$ $b = 18.88(2)$ $c = 9.564(9)$ $\beta = 107.45(5)^\circ$ Z = 4

X-ray Powder Pattern: Laytonville district, California, USA. (ICDD 19-421). 9.03 (100), 3.01 (70), 2.64 (55), 2.54 (25), 3.22 (20), 2.37 (20), 9.45 (16)

Chemistry:

	(1)	(2)	(3)	(4)
SiO_2	33.44	33.40	33.27	33.50
Al_2O_3	0.92	0.16	0.41	
Fe_2O_3	22.09	20.89	21.41	22.26
FeO	36.77	34.79	35.64	40.06
MnO	2.86	5.72	0.74	
MgO	0.15	0.25	0.64	
H_2O	4.25	[4.25]	[4.25]	4.19
Total	100.48	[99.46]	[96.36]	100.00

(1) Laytonville district, California, USA. (2) Do.; by electron microprobe. (3) Ambin massif, Italy; by electron microprobe; H_2O and Fe^{2+}:Fe^{3+} in (2–3) assumed same as (1). (4) $Fe^{2+}_6Fe^{3+}_3Si_6O_{20}(OH)_5$.

Occurrence: In meta-ironstones and Cu-Fe sulfide deposits, in blueschist facies metasediments formed at high pressure and low temperature.

Association: Howieite, zussmanite, stilpnomelane, spessartine, riebeckite, quartz, aegirine, grunerite, aragonite, manganoan siderite, ferroan kutnohorite (Laytonville district, California, USA).

Distribution: In the USA, in California, in the Laytonville quarry, at Covelo, and at Burn's Flats, Mendocino Co.; at Ward Creek, Cazadero, Sonoma Co.; and at Panoche Pass, San Benito Co.; in Oregon, at Wild Horse Lookout, Curry Co., and in the Powers quarry, Coos Co. From Salbertrand, Viafiorcia, and Beth-Ghinivert, Piedmont, Italy. At Termignon, Haute-Savoie, France. From Sifnos, Greece. At Süpüren-Karaalan, Eskişehir Province, Turkey. From the Diahöt Valley, and at Ouegoa Koumec, New Caledonia. A few other occurrences are known.

Name: To honor Professor William Alexander Deer (1910–), mineralogist-petrologist, Cambridge University, Cambridge, England.

Type Material: National Museum of Natural History, Washington, D.C., USA, 109455; The Natural History Museum, London, England, 1964,543.

References: (1) Agrell, S.O., M.G. Bown, and D. McKie (1965) Deerite, howieite and zussmanite, three new minerals from the Franciscan of the Laytonville district, Mendocino County, California. MSA meeting, Bozeman, Montana, July 26–31, 1964. Amer. Mineral., 50, 278 (abs.). (2) Agrell, S.O. and M. Gay (1970) De la deerite dans les Alpes franco-italiennes. Bull. Soc. fr. Minéral., 93, 263–264 (in French). (3) Fleet, M.E. (1977) The crystal structure of deerite. Amer. Mineral., 62, 990–998. (4) Muir Wood, R. (1979) The iron-rich blueschist facies minerals: I. Deerite. Mineral. Mag., 43, 251–259.