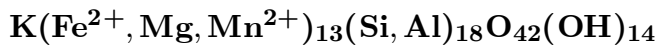


**Zussmanite**

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**Crystal Data:** Hexagonal. *Point Group:* 3 or  $\bar{3}$ . As tabular crystals, to about 1 mm.

**Physical Properties:** *Cleavage:* {0001}, perfect. *Hardness* = n.d. *D*(meas.) = 3.146  
*D*(calc.) = [3.14]

**Optical Properties:** Translucent. *Color:* Pale green in thin section. *Luster:* Vitreous.  
*Optical Class:* Uniaxial (-). *Pleochroism:* Weak; *O* = pale green; *E* = colorless.  $\omega = 1.643$   
 $\epsilon = 1.623$

**Cell Data:** *Space Group:*  $R\bar{3}$  or  $R\bar{3}$ .  $a = 11.66(2)$   $c = 28.69(2)$   $Z = 3$

**X-ray Powder Pattern:** Laytonville district, California, USA. (ICDD 19-1500).  
9.60 (100), 4.78 (45), 3.19 (25), 2.51 (16), 3.78 (10), 2.74 (10), 2.20 (10)

**Chemistry:** (1) No chemical analysis appears to have been published; the type description, however, gives the empirical formula  $(\text{K}_{0.92}\text{Na}_{0.07})_{\Sigma=0.99}(\text{Fe}_{10.85}^{2+}\text{Mg}_{1.33}\text{Mn}_{0.46}\text{Al}_{0.34}\text{Fe}_{0.11}^{3+}\text{Ti}_{0.01})_{\Sigma=13.10}(\text{Si}_{16.6}\text{Al}_{1.4})_{\Sigma=18.0}\text{O}_{42.2}(\text{OH})_{13.8}$ .

**Occurrence:** In an exotic block of metamorphosed shales, siliceous ironstones, and impure limestones, probably representing deep ocean sediments subjected to blueschist facies metamorphism.

**Association:** Deerite, howieite, stilpnomelane, spessartine, riebeckite, quartz, aegirine, grunerite, aragonite, manganoo siderite, ferroan kutnohorite, graphite.

**Distribution:** In the Laytonville quarry, Mendocino Co., California, USA.

**Name:** For Jack Zussman (1924– ), mineralogist-crystallographer, Manchester University, Manchester, England.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 109454; The Natural History Museum, London, England, 1964,545.

**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 Co., California. MSA meeting, Bozeman, Montana, July 26–31, 1964. *Amer. Mineral.*, 50, 278 (abs.). (2) Lopes-Vieira, A. and J. Zussman (1969) Further detail on the crystal structure of zussmanite. *Mineral. Mag.*, 37, 49–60. (3) Muir Wood, R. (1980) The iron-rich blueschist-facies minerals: 3. Zussmanite and related minerals. *Mineral. Mag.*, 43, 605–614. 5/9/91