

**McAllisterite****Mg<sub>2</sub>B<sub>12</sub>O<sub>14</sub>(OH)<sub>12</sub>•9H<sub>2</sub>O**

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**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . Rhombohedral crystals, to 12 mm, showing {0001}, {01 $\bar{1}$ 2}, {10 $\bar{1}$ 4}, imbedded in other borates and as efflorescences.

**Physical Properties:** *Cleavage:* Good on {0001} and {01 $\bar{1}$ 2}. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 1.867(5) D(calc.) = 1.866 Slowly soluble in H<sub>2</sub>O; fluoresces pale yellow under UV.

**Optical Properties:** Transparent. *Color:* Snow-white, white, colorless, amber with impurities; colorless in thin section.

*Optical Class:* Uniaxial (-).  $\omega = 1.505\text{--}1.507$   $\epsilon = 1.464\text{--}1.465$

**Cell Data:** *Space Group:*  $R\bar{3}c$ .  $a = 11.546(1)$   $c = 35.562(5)$   $Z = 6$

**X-ray Powder Pattern:** Furnace Creek district, California, USA; exhibits preferred orientation.

8.715 (100), 5.772 (50), 4.063 (50), 3.351 (50), 3.261 (50), 2.805 (50), 6.645 (35)

**Chemistry:**

	(1)	(2)	(3)
B <sub>2</sub> O <sub>3</sub>	53.43	53.6	54.35
FeO		0.25	
MnO		0.04	
MgO	10.06	10.4	10.49
H <sub>2</sub> O <sup>+</sup>		34.9	
H <sub>2</sub> O <sup>-</sup>		0.76	
H <sub>2</sub> O	36.51		35.16
Total	[100.00]	99.95	100.00

(1) Furnace Creek district, California, USA; recalculated to 100% after deduction of ginorite 15.85%, insoluble [clay] 7.32%, R<sub>2</sub>O<sub>3</sub> 1.32%, gypsum 0.51%, total impurities estimated 25%.

(2) Tincalayu deposit, Argentina; corresponds to (Mg<sub>2.01</sub>Fe<sub>0.03</sub><sup>2+</sup>)<sub>Σ=2.04</sub>B<sub>12</sub>O<sub>14</sub>(OH)<sub>12</sub>•9.10H<sub>2</sub>O.

(3) Mg<sub>2</sub>B<sub>12</sub>O<sub>14</sub>(OH)<sub>12</sub>•9H<sub>2</sub>O.

**Occurrence:** A secondary mineral derived from colemanite and priceite veins in altered basalt (Furnace Creek district, California, USA); a primary mineral in a metamorphosed borate playa deposit (Tincalayu deposit, Argentina); at a saline lake (China).

**Association:** Sassolite, ginorite, gypsum (Furnace Creek district, California, USA); starkeyite, gypsum (Sterling Hill, New Jersey, USA); rivadavite (Tincalayu deposit, Argentina); hexahydrite, hydroboracite, hungchaoite (China).

**Distribution:** In the USA, from the Mott colemanite prospect, Twenty Mule Team Canyon, and at the Eagle Borax Spring, Furnace Creek district, Death Valley, Inyo Co., California; from Sterling Hill, Sussex Co., New Jersey. Found about 15 km northwest of Tubutama, Sonora, Mexico. From the Tincalayu borax deposit, Salar del Hombre Muerto, Salta Province, Argentina. On the Qinghai-Xizang Plateau, Tibet, China, not further located. From the Inder borate deposit, Kazakhstan.

**Name:** To honor James Franklin McAllister (1911–2000), geologist, U.S. Geological Survey, Menlo Park, California, USA, who collected the originally described material.

**Type Material:** National School of Mines, Paris, France; Harvard University, Cambridge, Massachusetts, 109053; National Museum of Natural History, Washington, D.C., USA, 134613, 162598.

**References:** (1) Schaller, W.T., A.C. Vlisidis, and M.E. Mrose (1965) Macallisterite [mcallisterite], 2MgO•6B<sub>2</sub>O<sub>3</sub>•15H<sub>2</sub>O, a new hydrous magnesium borate mineral from the Death Valley region, Inyo County, California. *Amer. Mineral.*, 50, 629–640. (2) Aristarain, L.F. and C.S. Hurlbut, Jr. (1967) Macallisterite [mcallisterite], 2MgO•6B<sub>2</sub>O<sub>3</sub>•15H<sub>2</sub>O, from Salta, Argentina. *Amer. Mineral.*, 52, 1776–1784. (3) Dal Negro, A., C. Sabelli, and L. Ungaretti (1969) The crystal structure of macallisterite [mcallisterite], Mg<sub>2</sub>[B<sub>6</sub>O<sub>7</sub>(OH)<sub>6</sub>]<sub>2</sub>•9H<sub>2</sub>O. *Atti Rend. Accad. Lincei*, 47, 353–364.

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