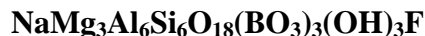


**Fluor-dravite**

**Crystal Data:** Hexagonal. *Point Group:* 3m. As irregular grains to a few mm.

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle.  
Hardness = 7 D(meas.) = n.d. D(calc.) = 3.120

**Optical Properties:** Transparent. *Color:* Blackish brown. *Streak:* Pale brown. *Luster:* Vitreous.  
*Optical Class:* Uniaxial (-).  $\omega = 1.645(2)$   $\epsilon = 1.621(2)$  *Pleochroism:* O = pale yellow-brown;  
E = colorless.

**Cell Data:** *Space Group:* R3m.  $a = 15.955(3)$   $c = 7.153(2)$   $Z = 3$

**X-ray Powder Pattern:** Crabtree emerald mine, Mitchell County, North Carolina, USA.  
3.475 (100), 2.583 (67), 2.961 (60), 1.920 (27), 3.998 (22), 6.375 (19), 2.043 (19)

<b>Chemistry:</b>	(1)	(2)		(1)	(2)
SiO <sub>2</sub>	36.02	36.35	Na <sub>2</sub> O	2.80	6.25
Al <sub>2</sub> O <sub>3</sub>	31.69	30.84	TiO <sub>2</sub>	0.25	
FeO	6.41		F	1.45	1.92
MnO	0.67		B <sub>2</sub> O <sub>3</sub>	[10.91]	10.53
ZnO	0.05		Li <sub>2</sub> O	[0.19]	1.92
CaO	0.25		H <sub>2</sub> O	[3.19]	2.73
MgO	7.71	12.19	- O = F <sub>2</sub>	0.61	0.81
			Total	101.00	100.00

(1) Crabtree emerald mine, Mitchell County, North Carolina, USA; average of 10 electron microprobe analyses supplemented by Mössbauer spectrometry, H determined by SIMS, B<sub>2</sub>O<sub>3</sub> calculated from structure, Li derived by SREF; corresponds to  $^{\text{X}}(\text{Na}_{0.88}\text{Ca}_{0.04})_{\Sigma=0.92}$   $^{\text{Y}}(\text{Mg}_{1.87}\text{Fe}_{0.87}\text{Mn}_{0.09}\text{Zn}_{0.01}\text{Ti}_{0.03}\text{Li}_{0.13})_{\Sigma=3.01}$   $^{\text{Z}}\text{Al}_6$   $^{\text{T}}(\text{Si}_{5.87}\text{B}_{0.05}\text{Al}_{0.08})\text{O}_{18}$   $^{\text{B}}(\text{BO}_3)_3$   $^{\text{V}}(\text{OH})_3$   $^{\text{W}}[\text{F}_{0.75}(\text{OH})_{0.47}]_{\Sigma=1.22}$ .

(2) NaMg<sub>3</sub>Al<sub>6</sub>Si<sub>6</sub>O<sub>18</sub>(BO<sub>3</sub>)<sub>3</sub>(OH)<sub>3</sub>F.

**Polymorphism & Series:** Solid-solution exists with fluor-schorl.

**Mineral Group:** Tourmaline supergroup, alkali group, subgroup 1.

**Occurrence:** Formed near the contact between a granitic pegmatite and country rock.

**Association:** K-feldspar, plagioclase, quartz, beryl, muscovite, garnet, biotite, fluorite.

**Distribution:** From the Crabtree emerald mine, Mitchell County, North Carolina, USA.

**Name:** As a *dravite* with dominant *fluorine* in the W site.

**Type Material:** National Museum of Natural History, Washington, D.C., USA (121341).

**References:** (1) Clark, C.M., F.C. Hawthorne, and L. Ottolini (2011) Fluor-dravite, NaMg<sub>3</sub>Al<sub>6</sub>Si<sub>6</sub>O<sub>18</sub>(BO<sub>3</sub>)<sub>3</sub>(OH)<sub>3</sub>F, a new mineral species of the tourmaline group from the Crabtree emerald mine, Mitchell County, North Carolina: Description and crystal structure. *Can. Mineral.*, 49, 57-62. (2) (2012) *Amer. Mineral.*, 98, 2067 (abs. ref. 1).