

Rosemaryite $(\text{Na, Ca, Mn}^{2+})(\text{Mn}^{2+}, \text{Fe}^{2+})(\text{Fe}^{3+}, \text{Fe}^{2+}, \text{Mg})\text{Al}(\text{PO}_4)_3$

©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Monoclinic. *Point Group:* $2/m$. Granular, massive, to 1 cm.

Physical Properties: *Cleavage:* Observed. Hardness = [> 4] (by analogy to ferrowyllieite).
D(meas.) = n.d. D(calc.) = [3.63]

Optical Properties: Semitransparent. *Color:* Dark green, deep brown to reddish brown.
Luster: Resinous.

Optical Class: Biaxial (-). *Pleochroism:* $X = Y$ = pale brownish yellow; Z = pale greenish yellow. $\alpha = 1.723(2)$ $\beta = 1.742(2)$ $\gamma = 1.758(2)$ $2V(\text{meas.}) = -80^\circ$

Cell Data: *Space Group:* $P2_1/n$. $a = 11.977(2)$ $b = 12.388(2)$ $c = 6.320(1)$
 $\beta = 114^\circ 27(1)'$ $Z = 4$

X-ray Powder Pattern: Buranga, Rwanda.

3.024 (100), 2.693 (100), 2.726 (85), 3.487 (70), 2.842 (60), 2.062 (55), 5.451 (50)

Chemistry:	(1)	(2)	(1)	(2)	
P_2O_5	43.84	43.27	Li_2O	0.04	
Al_2O_3	6.90	8.13	Na_2O	3.40	3.69
Fe_2O_3	14.58	16.81	K_2O	0.00	0.03
FeO	11.64	2.13	H_2O^+		2.31
MnO	13.62	19.79	H_2O^-		0.19
ZnO	0.02		H_2O	1.73	
MgO	0.47	0.68	insol.	1.78	1.84
CaO	1.81	1.10			
			Total	99.83	99.97

(1) Rock Ridge pegmatite, South Dakota, USA; corresponds to $(\text{Na}_{0.47}\text{Ca}_{0.04})_{\Sigma=0.51}(\text{Mn}_{0.20}^{2+}\text{Ca}_{0.15}\text{Na}_{0.15})_{\Sigma=0.50}(\text{Mn}_{0.69}^{2+}\text{Fe}_{0.31}^{2+})_{\Sigma=1.00}(\text{Fe}_{0.45}^{3+}\text{Mg}_{0.06}\text{Zn}_{0.02}\text{Li}_{0.01})_{\Sigma=0.54}(\text{Al}_{0.63}\text{Fe}_{0.37}^{3+})_{\Sigma=1.00}(\text{PO}_4)_{3.00}$. (2) Buranga, Rwanda; corresponds to $(\text{Na}_{0.59}\text{Ca}_{0.02})_{\Sigma=0.61}(\text{Mn}_{0.42}^{2+}\text{Ca}_{0.08})_{\Sigma=0.50}(\text{Mn}_{0.95}^{2+}\text{Fe}_{0.05}^{2+})_{\Sigma=1.00}(\text{Fe}_{0.82}^{3+}\text{Fe}_{0.10}^{2+}\text{Mg}_{0.08})_{\Sigma=1.00}(\text{Al}_{0.78}\text{Fe}_{0.22}^{3+})_{\Sigma=1.00}(\text{PO}_4)_{3.00}$.

Polymorphism & Series: Forms two series, with ferrowyllieite, and with wyllieite; $\text{Mn}^{2+} > \text{Fe}^{2+}$ in M(1); Fe^{3+} dominant in M(2a).

Occurrence: In zoned complex granite pegmatites.

Association: Trolleite, alluaudite, montebasite, scorzalite, strengite (Buranga, Rwanda).

Distribution: From the Rock Ridge pegmatite, near Custer, Custer Co., South Dakota, USA. At the Buranga pegmatite, near Gatumba, Rwanda.

Name: To honor Mrs. F. Rosemary Wyllie, wife of Professor Peter J. Wyllie, namesake of wyllieite, q.v.

Type Material: National Museum of Natural History, Washington, D.C., USA, 162559.

References: (1) Moore, P.B. and J. Ito (1979) Alluaudites, wyllieites, arrojadites: crystal chemistry and nomenclature. *Mineral. Mag.*, 43, 227–235. (2) (1980) *Amer. Mineral.*, 65, 810–811 (abs. ref. 1). (3) Fransolet, A.-M. (1995) Wyllieite et rosemaryite dans la pegmatite de Buranga, Rwanda. *Eur. J. Mineral.*, 7, 567–575 (in French with English abs.).