## Maghagendorfite $NaMn^{2+}(Mg, Fe^{3+}, Fe^{2+})_2(PO_4)_3$



**Crystal Data:** Monoclinic. *Point Group:* $2/m$. Granular, massive; as laths in hagendorfite.

**Physical Properties:** *Cleavage:* [Good on {001}; poor on {110}] (by analogy to hagendorfite). Hardness = [∼4.5] D(meas.) = n.d. D(calc.) = n.d.

**Optical Properties:** [Translucent.] *Color:* [Greenish black.]
*Optical Class:* [Biaxial.] $\alpha$ = n.d. $\beta$ = n.d. $\gamma$ = n.d. 2V(meas.) = n.d.

**Cell Data:** *Space Group:* n.d. Z = n.d.

**X-ray Powder Pattern:** n.d.

**Chemistry:**

| | (1) | (2) | | (1) | (2) |
|---|---|---|---|---|---|
| $P_2O_5$ | 44.32 | 42.14 | $Na_2O$ | 6.12 | 7.44 |
| $Al_2O_3$ | 0.01 | 0.07 | $K_2O$ | 0.00 | |
| $Fe_2O_3$ | 9.89 | 6.77 | $Li_2O$ | 0.06 | |
| FeO | 8.75 | 22.12 | F | | 0.57 |
| MnO | 20.42 | 7.46 | $H_2O^+$ | 3.06 | n.d. |
| ZnO | 0.23 | | $-O = F_2$ | | 0.24 |
| MgO | 5.06 | 6.88 | insol. | 1.05 | |
| CaO | 0.86 | 2.38 | Total | 99.83 | 95.59 |

(1) Dyke Lode, Custer, South Dakota, USA; corresponding to $Na_{0.10}(Na_{0.83}Mn_{0.10}Ca_{0.07})_{\Sigma=1.00}Mn_{1.00}(Mg_{0.60}Fe^{3+}_{0.58}Fe^{2+}_{0.57}Mn_{0.24}Li_{0.01})_{\Sigma=2.00}(PO_4)_3$. (2) Rapid Creek, Canada; by electron microprobe, $Fe^{3+}$:$Fe^{2+}$ from stoichiometry; corresponding to $Na_{0.82}(Na_{0.40}Fe^{2+}_{0.38}Ca_{0.22})_{\Sigma=1.00}(Mn_{0.53}Fe^{2+}_{0.47})_{\Sigma=1.00}(Mg_{0.87}Fe^{2+}_{0.70}Fe^{3+}_{0.43})_{\Sigma=2.00}(PO_4)_3$.

**Mineral Group:** Alluaudite group.

**Occurrence:** In a complex zoned granite pegmatite.

**Association:** Hagendorfite (Rapid Creek, Canada).

**Distribution:** From the Dyke Lode, near Custer, Custer Co., South Dakota, USA. At Rapid Creek, Yukon Territory, Canada.

**Name:** As the *magnesium* analog of *hagendorfite*.

**Type Material:** n.d.

**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) Robinson, G.W., J. Van Velthuizen, H.G. Ansell, and B.D. Sturman (1992) Mineralogy of the Rapid Creek and Big Fish River area, Yukon Territory. Mineral. Record, 23(4), 1–47, esp. 34–36.