Qingheiite-(Fe^{2+}) $Na_2Fe^{2+}MgAl(PO_4)_3$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As rims, to 1 mm., around frondelite grains.

Physical Properties: *Cleavage*: Perfect on {010}. F*racture*: Conchoidal to splintery. *Tenacity*: Brittle. *Hardness* = 4 D(meas.) = 3.6(2) D(calc.) = 3.54

Optical Properties: Transparent. *Color*: Dark green. *Streak*: Pale to bottle green. *Luster*: Resinous. *Optical Class*: Biaxial (-). α = 1.692(5) β = 1.718(3) γ = 1.720(5) 2V(calc.) = 34.1° *Pleochroism: X* = pale pinkish brown, *Y* = pale green, *Z* = pale bluish gray. *Dispersion*: Strong, *r* > *v*. *Orientation*: $\beta \parallel b$, α and γ lie in the (010) plane.

Cell Data: *Space Group*: $P2_1/n$. *a* =11.910(2) *b* = 12.383(3) *c* = 6.372(1) β = 114.43(3)° Z = 4

X-ray Powder Pattern: Sebastião Cristino pegmatite, Minas Gerais, Brazil.
3.047 (100), 2.688 (90), 2.849 (80), 2.711 (40), 2.500 (40), 3.468 (35), 2.810 (35)

Chemistry:

	(1)	(2)
P_2O_5	46.51	48.61
Al_2O_3	6.94	11.64
Fe_2O_3	[10.58]	
FeO	[11.46]	16.40
MgO	6.32	9.20
MnO	11.23	
CaO	0.24	
Na_2O	6.27	14.15
K_2O	0.01	.
Total	99.56	100.00

(1) Sebastião Cristino pegmatite, Minas Gerais, Brazil; average of 6 electron microprobe analyses, FeO and Fe_2O_3 calculated; corresponds to $(\square_{0.65}Na_{0.35})_{\Sigma=1.00}(Na_{0.58}Mn^{2+}_{0.40}Ca_{0.02})_{\Sigma=1.00}(Fe^{2+}_{0.68}Mn^{2+}_{0.32})_{\Sigma=1.00}(Mg_{0.72}Fe^{3+}_{0.23}Fe^{2+}_{0.05})_{\Sigma=1.00}(Al_{0.62}Fe^{3+}_{0.38})_{\Sigma=1.00}[PO_4]_3$. (2) $Na_2Fe^{2+}MgAl(PO_4)_3$.

Mineral Group: Wyllieite group.

Occurrence: In a complex granitic pegmatite body in garnet-biotite-sillimanite-bearing schist.

Association: Frondelite, albite, quartz.

Distribution: From the Sebastião Cristino pegmatite, between the towns of Mendes Pimentel and Linópolis, Conselheiro Pena district, Minas Gerais, Brazil.

Name: Indicates the Fe^{2+}-equivalent of *qingheiite*.

Type Material: Laboratory of Mineralogy, University of Liège, Belgium (#20381) and in the collections of the Natural History Museum, Luxembourg (PP022T).

References: (1) Hatert, F., M. Baijot, S. Philippo, and J. Wouters (2010) Qingheiite-(Fe^{2+}), $Na_2Fe^{2+}MgAl(PO_4)_3$, a new phosphate mineral from the Sebastião Cristino pegmatite, Minas Gerais, Brazil. Eur. J. Mineral., 22, 459-467. (2) (2011) Amer. Mineral., 96, 944-945 (abs. ref. 1).