Ferro-edenite $\mathbf{NaCa_2(Fe^{2+},Mg)_5(Si_7Al)O_{22}(OH)_2}$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Commonly as well-formed prismatic crystals; fibrous; as reaction rims on pyroxenes. *Twinning:* [Simple or multiple twinning ∥ {100}.]

Physical Properties: *Cleavage:* [Good on {110}, intersecting at ∼56° and ∼124°; partings on {100}, {001}.] *Tenacity:* [Brittle.] Hardness = [5–6] D(meas.) = ∼3.4 D(calc.) = n.d.

Optical Properties: Semitransparent. *Color:* Dark green, black. *Luster:* [Vitreous.] *Optical Class:* Biaxial (–). *Pleochroism:* Distinct; X = yellow; Y = green; Z = dark green. *Orientation:* $Y = b$; $Z \wedge c \simeq 15°$. *Dispersion:* Weak. α = 1.65–1.70 β = 1.66–1.71 γ = 1.67–1.73 2V(meas.) = 20°–90°

Cell Data: *Space Group:* [$C2/m$.] a = n.d. b = n.d. c = n.d. β = n.d. Z = n.d.

X-ray Powder Pattern: n.d.

Chemistry:

	(1)	(2)
SiO_2	45.74	43.25
TiO_2	1.29	0.27
Al_2O_3	4.98	6.07
Fe_2O_3		1.19
FeO	27.86	31.64
MnO	1.14	1.05
MgO	5.96	1.49
CaO	10.02	10.65
Na_2O	1.99	1.34
K_2O	0.54	0.87
Total	99.52	97.82

(1) La Tabatière, Canada; by electron microprobe, Fe^{2+}:Fe^{3+} from stoichiometry and charge balance; corresponds to $(Na_{0.55}K_{0.11})_{\Sigma=0.66}(Ca_{1.66}Mn_{0.15}Fe^{2+}_{0.14}Na_{0.05})_{\Sigma=2.00}(Fe^{2+}_{3.47}Mg_{1.38}Ti_{0.15})_{\Sigma=5.00}(Si_{7.09}Al_{0.91})_{\Sigma=8.00}O_{22}(OH)_2$. (2) Tibchi ring complex, Nigeria; by electron microprobe, Fe^{2+}:Fe^{3+} calculated from charge balance; corresponds to $(Na_{0.42}K_{0.18})_{\Sigma=0.60}(Ca_{1.85}Fe^{2+}_{0.15})_{\Sigma=2.00}(Fe^{2+}_{4.15}Mg_{0.36}Al_{0.18}Fe^{3+}_{0.14}Mn_{0.14}Ti_{0.03})_{\Sigma=5.00}(Si_{7.01}Al_{0.99})_{\Sigma=8.00}O_{22}(OH)_2$.

Polymorphism & Series: Forms a series with edenite.

Mineral Group: Amphibole (calcic) group: $Mg/(Mg + Fe^{2+}) < 0.5$; $(Na + K)_A \geq 0.5$; $Na_B < 0.67$; $(Ca + Na)_B \geq 1.34$; 6.75 Si 7.25.

Occurrence: An early or deuteric phase replacing pyroxene in syenitic ring complexes; from medium-grade metamorphic amphibolites and gneisses; from plutonic igneous rocks.

Association: Pyroxene, ferro-actinolite, monazite, magnetite, fluorite (Tibchi ring complex, Nigeria).

Distribution: From the Baie-des-Moutons complex, La Tabatière, Quebec, Canada. At the Tibchi ring complex, Nigeria. Undoubtedly occurs at other localities but qualifying analyses appear lacking.

Name: For its high *ferrous* iron content and relation to *edenite*.

Type Material: n.d.

References: (1) Lalonde, A.E. and R.F. Martin (1983) The Baie-des-Moutons syenitic complex, La Tabatière, Québec, II. The ferromagnesian minerals. Can. Mineral., 21, 81–91. (2) Ike, E.C., P. Bowden, and R.F. Martin (1985) Amphibole in the porphyries of the Tibchi anorogenic ring-complex, Nigeria: product of deuteric adjustments. Can. Mineral., 23, 447–456. (3) Phillips, W.R. and D.T. Griffen (1981) Optical mineralogy, 221.