

Ferrosilite



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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As coarse anhedral to subhedral grains, up to 5 mm. *Twinning:* On {100}.

Physical Properties: *Cleavage:* Good on {210}, $(210) \wedge (2\bar{1}0) \sim 88^\circ$; partings on {100}, {010}. Hardness = 5–6 $D(\text{meas.}) = 3.96$ $D(\text{calc.}) = [3.87]$

Optical Properties: Semitransparent. *Color:* Green, dark brown; greenish or reddish in thin section.

Optical Class: Biaxial (-). *Orientation:* $X = b$. *Dispersion:* $r < v$, strong. $\alpha = 1.755\text{--}1.768$
 $\beta = 1.763\text{--}1.770$ $\gamma = 1.772\text{--}1.788$ $2V(\text{meas.}) = 55^\circ\text{--}90^\circ$

Cell Data: *Space Group:* $Pbca$. $a = 18.431$ $b = 9.080$ $c = 5.238$ $Z = 8$

X-ray Powder Pattern: Oriibi Gorge, South Africa. (ICDD 19-607).
3.21 (100), 2.892 (75), 2.504 (55), 2.577 (50), 2.126 (50), 2.979 (45), 4.58 (35)

Chemistry:

	(1)
SiO ₂	44.43
TiO ₂	0.12
Al ₂ O ₃	2.96
Fe ₂ O ₃	0.70
FeO	44.91
MnO	1.20
MgO	3.38
CaO	1.69
Na ₂ O	0.07
K ₂ O	0.05
Total	99.51

(1) Bauchi, Nigeria; corresponds to $(\text{Fe}_{1.60}^{2+}\text{Mg}_{0.21}\text{Ca}_{0.08}\text{Mn}_{0.04}\text{Fe}_{0.02}^{3+}\text{Na}_{0.01})_{\Sigma=1.96}$
 $(\text{Si}_{1.90}\text{Al}_{0.10})_{\Sigma=2.00}\text{O}_6$.

Polymorphism & Series: Dimorphous with clinoferrosilite; forms a series with enstatite.

Mineral Group: Pyroxene group.

Occurrence: In medium- to high-grade metamorphosed iron formations.

Association: Magnetite, hematite, ferroan diopside, quartz, almandine.

Distribution: From Bauchi, Nigeria. At Tiris, Mauritania. From Oriibi Gorge, Marble Delta, Natal, South Africa. In the USA, in Montana, around Copper Mountain and Carmichael Creek, in the Tobacco Root Mountains; in the Ruby Creek area, in the Gravelly Range, Madison Co.; also the Carter Creek area, in the Ruby Mountains, Beaverhead and Madison Cos.; and in Utah, at Hanksville, Wayne Co. On Arcedeckne Island, District of Franklin, Arctic Canada.

Name: For FERROus iron and SILicon in the composition; originally a “normative” mineral in rocks.

References: (1) Deer, W.A., R.A. Howie, and J. Zussman (1978) Rock-forming minerals, (2nd edition), v. 2A, single-chain silicates, 20–161. (2) Turnock, A.C., D.H. Lindsley, and J.E. Grover (1973) Synthesis and unit cell parameters of Ca–Mg–Fe pyroxenes. *Amer. Mineral.*, 58, 50–59. (3) Sueno, S., M. Cameron, and C.T. Prewitt (1976) Orthoferrosilite: high temperature crystal chemistry. *Amer. Mineral.*, 61, 38–53.

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