

**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . In crystals, to 0.5 mm; as skeletal rims on other minerals; crystalline massive.

**Physical Properties:** Hardness = n.d. D(meas.) = 3.434 D(calc.) = 3.596

**Optical Properties:** Transparent. *Color:* Pale green; colorless in thin section.  
*Optical Class:* Biaxial (-). *Orientation:*  $X = b; Y = c; Z = a$ .  $\alpha = 1.660\text{--}1.689$   $\beta = 1.720$   
 $\gamma = 1.694\text{--}1.728$   $2V(\text{meas.}) = 51(1)^\circ$   $2V(\text{calc.}) = 53^\circ\text{--}61^\circ$

**Cell Data:** *Space Group:* [*Pbnm*] (by analogy to the olivine group).  $a = 4.859$   $b = 11.132$   
 $c = 6.420$   $Z = 4$

**X-ray Powder Pattern:** Mt. Shaheru, Congo.  
2.949 (100), 2.680 (85), 2.604 (80), 3.658 (70), 1.830 (60), 2.414 (40), 5.569 (35)

**Chemistry:**

	(1)	(2)
SiO <sub>2</sub>	32.71	31.96
TiO <sub>2</sub>	0.23	
Al <sub>2</sub> O <sub>3</sub>	0.26	
Fe <sub>2</sub> O <sub>3</sub>	0.66	
FeO	29.34	38.21
MnO	1.65	
MgO	4.95	
CaO	29.30	29.83
Na <sub>2</sub> O	0.34	
K <sub>2</sub> O	0.36	
H <sub>2</sub> O <sup>+</sup>	0.25	
H <sub>2</sub> O <sup>-</sup>	0.06	
P <sub>2</sub> O <sub>5</sub>	0.07	
Total	100.18	100.00

(1) Mt. Shaheru, Congo. (2) CaFeSiO<sub>4</sub>.

**Polymorphism & Series:** Forms a series with monticellite.

**Occurrence:** In melilite-nephelinite lava (Mt. Shaheru, Congo); in calcareous skarn (Tazheran massif, Russia).

**Association:** Melilite, nepheline, clinopyroxene, kalsilite, götzenite, combeite, sodalite, magnetite, perovskite, apatite, "hornblende," biotite (Mt. Shaheru, Congo); titanian augite, wollastonite, melilite, garnet, calcite, cuspidine, diopside, perovskite, troilite, graphite (Tazheran massif, Russia).

**Distribution:** On Mt. Shaheru, the extinct southern cone of Mt. Nyiragongo, Kivu Province, Congo (Zaire). In the Wessels mine, near Kuruman, Cape Province, South Africa. From the Tazheran alkalic massif, west of Lake Baikal, eastern Siberia, Russia. In the Angra dos Reis meteorite.

**Name:** For Dr. Egon Kirschstein, German geologist, a pioneer in the geological exploration of Kivu Province, Congo (Zaire).

**Type Material:** Royal Museum of Central Africa, Tervuren, Belgium, RGM8037; Harvard University, Cambridge, Massachusetts, USA.

**References:** (1) Sahama, T.G. and K. Hytönen (1957) Kirschsteinite, a natural analogue to synthetic iron monticellite, from the Belgian Congo. *Mineral. Mag.*, 31, 698–699. (2) (1958) *Amer. Mineral.*, 43, 790 (abs. ref. 1). (3) Konev, A.A., Z.F. Ushchapovskaya, and V.S. Lebedeva (1970) First find of magnesian kirschsteinite in the USSR. *Doklady Acad. Nauk SSSR*, 190, 932–935 (in Russian).

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