Enstatite  \( \text{Mg}_2\text{Si}_2\text{O}_6 \)

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Crystal Data: Orthorhombic. Point Group: 2/m 2/m 2/m. Crystals prismatic, to 40 cm; commonly lamellar, fibrous, or massive. Twinning: Simple and lamellar twinning on \{100\}.

Physical Properties: Cleavage: Good, \{210\}, \{210\} \& \{2\overline{1}0\} \sim 88°; partings on \{100\} and \{010\}. Fracture: Uneven. Tenacity: Brittle. Hardness = 5–6 D(meas.) = 3.2–3.9 D(calc.) = 3.189


Optical Class: Biaxial (+). Orientation: X = b; Y = a; Z = c. Dispersion: \( r < v \), weak to moderate. \( \alpha = 1.649–1.667 \) \( \beta = 1.653–1.671 \) \( \gamma = 1.657–1.680 \) 2V(meas.) = 55°–90°

Cell Data: Space Group: Pnca. \( a = 18.23 \) \( b = 8.84 \) \( c = 5.19 \) \( Z = 8 \)

X-ray Powder Pattern: Bamble, Norway.
3.175 (100), 2.878 (55), 2.540 (25), 1.488 (25), 2.497 (18), 2.477 (18), 1.473 (18)

Chemistry:
\[
\begin{array}{ccc}
\text{SiO}_2 & 58.48 & \text{MnO} \\
\text{TiO}_2 & \text{trace} & \text{MgO} \\
\text{Al}_2\text{O}_3 & 0.88 & \text{CaO} \\
\text{Fe}_2\text{O}_3 & 0.72 & \text{Na}_2\text{O} \\
\text{Cr}_2\text{O}_3 & 0.25 & \text{K}_2\text{O} \\
\text{FeO} & 3.93 & \text{H}_2\text{O}^- \\
\end{array}
\]
\( \text{Total} \) 100.01

(1) Maliba Matso, Lesotho; corresponds to (Mg\text{1.77–1.80}Fe^{2+}\text{0.11–0.12}Al\text{0.04–0.06}Ca\text{0.02–0.04}Na\text{0.02–0.04}Fe^{3+}\text{0.002–0.003})\text{Si}_2\text{O}_6\cdot\text{H}_2\text{O}.

Polymorphism & Series: Dimorphous with clinoenstatite; forms a series with ferrosilite.

Mineral Group: Pyroxene group.

Occurrence: In pyroxenites, peridotites, and dunites; in ultramafic inclusions in alkaline olivine basalts and kimberlite; in mafic volcanics, rarely in felsic volcanics. Characteristic of charnockites and the granulite metamorphic facies, in regionally metamorphosed rocks and metagabbros. Common in chondrite, achondrite, and stony-iron meteorites.


Name: From the Greek for opponent, in allusion to its refractory nature under the blowpipe.


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