

Pyrope

Mg₃Al₂(SiO₄)₃

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Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. Subhedral to euhedral crystals, showing the dodecahedron or trapezohedral forms, to 20 cm; also granular, massive.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. *Hardness* = 7–7.5
D(meas.) = 3.582 D(calc.) = 3.563

Optical Properties: Transparent to translucent. *Color:* Purple-red, pinkish red, red-orange, deep red to almost black; some examples are bluish green in daylight and wine-red in artificial light; colorless to pink in thin section. *Streak:* White. *Luster:* Vitreous.
Optical Class: Isotropic. $n = 1.714$

Cell Data: *Space Group:* $Ia\bar{3}d$. $a = 11.459$ $Z = 8$

X-ray Powder Pattern: Synthetic.

2.562 (100), 2.865 (60), 1.5312 (50), 2.443 (40), 1.5890 (30), 2.247 (25), 2.339 (20)

Chemistry:

	(1)	(2)
SiO ₂	45.21	44.71
TiO ₂	0.00	
Al ₂ O ₃	25.55	25.29
FeO	0.91	
MnO	0.02	
MgO	28.83	30.00
CaO	0.28	
Total	100.80	100.00

(1) Dora-Maira massif, Italy; by electron microprobe, corresponding to (Mg_{2.87}Fe_{0.05}Ca_{0.02})_{Σ=2.94}Al_{2.01}Si_{3.02}O₁₂. (2) Mg₃Al₂(SiO₄)₃.

Polymorphism & Series: Forms two series, with almandine, and with knorringite.

Mineral Group: Garnet group.

Occurrence: In ultramafic rocks, as peridotites, kimberlites, eclogites, serpentinites, and in “hornblende”-garnet-plagioclase rocks and anorthosites. Also in amphibole and biotite schists, and as a detrital mineral.

Association: Ilmenite, phlogopite, olivine, “hornblende,” plagioclase, pyroxenes, diamond, kyanite, rutile, chlorite, titanite, glaucophane, omphacite.

Distribution: Widespread. The following localities have all produced substantial amounts of gem material. Around Měrunice (Meronitz), Czech Republic. Immense crystals in the Dora-Maira massif, Parigi, near Martiniana Po, Piedmont, Italy. In Germany, from Zöblitz and Greifendorf, Saxony. From South Africa, especially at the diamond mines around Kimberley, Cape Province. Along the Umba River and in the Pare Mountains, Tanzania. In the USA, at Masons' Mountain, near Cowee Creek, Macon Co., North Carolina, and from Buell Park, near Fort Defiance, Apache Co., Arizona. In Australia, 20 km from Bingara, New South Wales, and at Proston, Anakie, and Ruby Vale, Queensland. From San Martin and Quines, San Luis, Argentina. At Gravata, Pernambuco, Brazil.

Name: From the Greek for *firelike* because of its fire-red color.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 437–447. (2) Deer, W.A., R.A. Howie, and J. Zussman (1982) Rock-forming minerals, (2nd edition), v. 1A, orthosilicates, 468–698, esp. 498–535. (3) Chopin, C. (1984) Coesite and pure pyrope in high-grade blueschists of the Western Alps: a first record and some consequences. *Contr. Mineral. Petrol.*, 86, 107–118. (4) (1966) NBS Mono. 25, 4, 24.

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