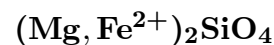


# Ringwoodite



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**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . As rounded grains, to 100  $\mu\text{m}$ , or massive.

**Physical Properties:** Hardness = n.d.  $D(\text{meas.}) = \text{n.d.}$   $D(\text{calc.}) = 3.90$

**Optical Properties:** Semitransparent. *Color:* Purple, bluish to smoky gray, colorless.

*Optical Class:* Isotropic.  $n = 1.768(3)$

**Cell Data:** *Space Group:*  $Ia\bar{3}d$ .  $a = 8.113\text{--}8.127$   $Z = 8$

**X-ray Powder Pattern:** Tenham meteorite.

2.447 (100), 1.434 (60), 2.028 (40), 2.872 (20), 1.560 (20), 1.0559 (10), 0.8283 (10)

**Chemistry:**

	(1)	(2)
SiO <sub>2</sub>	38.9	38.42
TiO <sub>2</sub>		0.05
FeO	23.4	22.98
MnO		0.30
MgO	37.0	37.86
CaO		0.05
Total	99.3	[99.66]

(1) Tenham meteorite; by electron microprobe, corresponding to  $(\text{Mg}_{1.48}\text{Fe}_{0.52}^{2+})_{\Sigma=2.00}\text{SiO}_4$ .

(2) Pampa del Infierno meteorite; by electron microprobe, Al<sub>2</sub>O<sub>3</sub>, Cr<sub>2</sub>O<sub>3</sub>, NiO, Na<sub>2</sub>O, K<sub>2</sub>O all < 0.01%, original total given as 99.64%; corresponds to  $(\text{Mg}_{1.48}\text{Fe}_{0.52}^{2+})_{\Sigma=2.00}\text{SiO}_4$ .

**Polymorphism & Series:** Trimorphous with forsterite and wadsleyite.

**Occurrence:** In veinlets cutting the matrix of meteorites and replacing olivine; probably produced during shock metamorphism.

**Association:** Majorite, magnesian silicate glass.

**Distribution:** In the Tenham, Pampa del Infierno, Catherwood, and Coorara chondrite meteorites.

**Name:** For Professor Alfred Edward Ringwood (1930–1993), noted geochemist of the Australian National University, Canberra, Australia.

**Type Material:** The Natural History Museum, London, England, 1935,792.

**References:** (1) Binns, R.A., R.J. Davis, and S.J.B. Reed (1969) Ringwoodite, natural  $(\text{Mg}, \text{Fe})_2\text{SiO}_4$  spinel in the Tenham meteorite. *Nature*, 221, 943–944. (2) (1969) *Amer. Mineral.*, 54, 1219 (abs. ref. 1). (3) Coleman, L.C. (1977) Ringwoodite and majorite in the Catherwood meteorite. *Can. Mineral.*, 15, 97–101. (4) Boctor, N.Z., P.M. Bell, and H.K. Mao (1982) Petrology and shock metamorphism of Pampa del Infierno chondrite. *Geochim. Cosmochim. Acta*, 46, 1903–1911.