# Wagnerite $(Mg,Fe^{2+})_2(PO_4)F$



**Crystal Data:** Monoclinic. *Point Group:* $2/m$. Typically in prismatic coarse anhedral crystals, elongated and striated along [001], complex vincinal form development, with more than thirty forms noted, to 20 cm; granular, massive.

**Physical Properties:** *Cleavage:* On {100}, {120}, imperfect; on {001}, interrupted. *Fracture:* Uneven, subconchoidal, splintery. Hardness = 5–5.5 D(meas.) = 3.15 D(calc.) = 3.15

**Optical Properties:** Translucent to nearly opaque. *Color:* Wine-yellow, orange, yellowish brown, pale gray, white, flesh-red, pale green; colorless in transmitted light. *Luster:* Vitreous to slightly resinous.
*Optical Class:* Biaxial (+). *Orientation:* $Y = b$; $Z \wedge c = -20°$ to $-21.5°$. *Dispersion:* $r > v$, weak, inclined. $\alpha = 1.568–1.588$ $\beta = 1.572–1.589$ $\gamma = 1.582–1.598$ 2V(meas.) = 25°–35°

**Cell Data:** *Space Group:* $P2_1/a$. $a = 11.945–11.985$ $b = 12.679–12.738$ $c = 9.644–9.70$ $\beta = 108.18°–108.36°$ Z = 16

**X-ray Powder Pattern:** Star Lake, Canada; close to magniotriplite.
2.985 (100), 3.297 (65), 3.123 (63), 2.854 (59), 2.758 (25), 2.710 (22), 1.584 (15)

**Chemistry:**

| | (1) | (2) | (3) |
|---|---|---|---|
| $P_2O_5$ | 43.45 | 42.68 | 43.65 |
| FeO | 0.95 | 6.04 | |
| MnO | 0.70 | 0.92 | |
| MgO | 48.35 | 43.76 | 49.58 |

| | (1) | (2) | (3) |
|---|---|---|---|
| F | 11.49 | 8.27 | 11.69 |
| OH | | 2.82 | |
| $-O = (F_2, OH)$ | 4.84 | 4.81 | 4.92 |
| Total | 100.10 | 99.68 | 100.00 |

(1) Werfen, Austria; corresponds to $(Mg_{1.96}Fe_{0.02}Mn_{0.02})_{\Sigma=2.00}(PO_4)_{1.00}F_{0.99}$. (2) Miregn, Switzerland; by electron microprobe, total Fe as FeO, $(OH)^{1-}$ from IR and stoichiometry; corresponds to $(Mg_{1.82}Fe_{0.14}Mn_{0.02})_{\Sigma=1.98}(PO_4)_{1.01}[F_{0.72}(OH)_{0.28}]_{\Sigma=1.00}$. (3) $Mg_2(PO_4)F$.

**Occurrence:** A rare accessory mineral in metamorphic rocks of moderate to high grade; uncommon in pegmatites.

**Association:** Lazulite, ferroan magnesite, chlorite (Höllgraben, Austria); corundum, sillimanite, plagioclase, biotite, monazite-(Ce), apatite, andalusite, tourmaline (Santa Fe Mountain, Colorado, USA); surinamite, musgravite, garnet, sapphirine, chrysoberyl, cordierite (Casey Bay, Antarctica).

**Distribution:** In Austria, in Salzburg, from Höllgraben, Färbergraben, Radelgraben, and Schladming-graben, near Werfen, and Bischofshofen, and from Webing, near Abtenau. In Germany, in the Silberberg mine, Bodenmais, Bavaria; on the Nickenicher Sattel and Bellerberg volcanoes, Eifel district; and from the Zechstein salt deposit, Hannover, Lower Saxony. At Miregn, Val d'Ambra, Tessin, Switzerland. From Skřiářov, near Velká Bíteš, and Dolní Bory, near Velké Meziříčí, Czech Republic. Large crystals from Porsgrunn and Havredal, Bamble, Norway. At Hålsjöberget, Värmland, Sweden. In the Kyakhta sillimanite deposit, Buryatia. On Santa Fe Mountain, near Idaho Springs, Clear Creek Co., Colorado; in the Dome Rock Mountains, Yuma Co., Arizona, USA. From the Star Lake area, near Sherridon, Manitoba, Canada. At Bimbowrie, near Olary, South Australia. From Casey Bay, Enderby Land, Antarctica. Additional localities are known, many from single specimens.

**Name:** Honoring F.M. von Wagner (1768–1851), mining official in Munich, Germany.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 845–848. (2) Coda, A., G. Giuseppetti, and C. Tadini (1967) The crystal structure of wagnerite. Atti Rend. Accad. Lincei, 43, 212–224. (3) Irouschek-Zumthor, A. and T. Armbruster (1985) Wagnerite from a metapelitic rock of the Simano Nappe (Leopontine Alps, Switzerland). Schweiz. Mineral. Petrog. Mitt., 65, 137–151. (4) Leroux, M.V. and T.S. Ercit (1992) Wagnerite, an accessory phase in cordierite-anthophyllite gneiss from Star Lake, Manitoba. Can. Mineral., 30, 1161–1165.