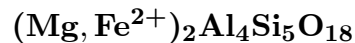


# Cordierite



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**Crystal Data:** Orthorhombic, pseudo-hexagonal. *Point Group:*  $2/m\ 2/m\ 2/m$ . Crystals short prismatic, striated  $\parallel$  [001], to 18 cm; typically granular to compact, massive. *Twinning:* Common on {110}, {130}, simple, lamellar, cyclical.

**Physical Properties:** *Cleavage:* Fair on {100}, poor on {001} and {010}. *Fracture:* Subconchoidal. *Tenacity:* Brittle. *Hardness* = 7–7.5 *D*(meas.) = 2.60–2.66 *D*(calc.) = 2.505

**Optical Properties:** Transparent to translucent. *Color:* Blue, smoky blue, bluish violet; greenish, yellowish brown, gray; colorless to very pale blue in thin section. *Luster:* Vitreous. *Optical Class:* Biaxial (+) or (-). *Pleochroism:* *X* = pale yellow, green; *Y* = violet, blue-violet; *Z* = pale blue. *Orientation:* *X* = *c*; *Y* = *a*; *Z* = *b*. *Dispersion:*  $r < v$ , weak to marked. *Absorption:*  $Z > Y > X$ .  $\alpha = 1.527\text{--}1.560$   $\beta = 1.532\text{--}1.574$   $\gamma = 1.537\text{--}1.578$   $2V$ (meas.) =  $35^\circ\text{--}106^\circ$

**Cell Data:** *Space Group:* *Cccm*. *a* = 17.079(3) *b* = 9.730(2) *c* = 9.356(2) *Z* = 4

**X-ray Powder Pattern:** Synthetic. 8.45 (100), 8.52 (95), 3.039 (65), 3.035 (65), 3.132 (55), 3.012 (55), 4.09 (50)

<b>Chemistry:</b>	(1)	(2)		(1)	(2)
SiO <sub>2</sub>	50.2	49.46	MgO	12.8	12.06
TiO <sub>2</sub>	< 0.01	0.01	CaO	0.23	0.03
Al <sub>2</sub> O <sub>3</sub>	33.5	33.58	Na <sub>2</sub> O	0.26	0.14
Fe <sub>2</sub> O <sub>3</sub>	0.14	0.14	K <sub>2</sub> O	0.14	0.30
FeO	0.84	2.12	H <sub>2</sub> O <sup>+</sup>	1.69	1.71
MnO	0.06	0.08	H <sub>2</sub> O <sup>-</sup>	0.12	0.10
			<b>Total</b>	<b>99.98</b>	<b>99.73</b>

(1) White Well, Western Australia; corresponds to  $(\text{Mg}_{1.91}\text{Fe}_{0.08}^{2+}\text{Na}_{0.05}\text{Ca}_{0.02}\text{K}_{0.02}\text{Mn}_{0.01})_{\Sigma=2.09}\text{Al}_{3.95}\text{Si}_{5.02}\text{O}_{18}$ . (2) Smith Ridge, Boehls Butte quadrangle, Idaho, USA; corresponds to  $(\text{Mg}_{1.81}\text{Fe}_{0.18}^{2+}\text{K}_{0.04}\text{Ca}_{0.03}\text{Mn}_{0.01})_{\Sigma=2.07}\text{Al}_{3.99}\text{Si}_{4.98}\text{O}_{18}$ .

**Polymorphism & Series:** Dimorphous with indialite; forms a series with sekaninaite.

**Occurrence:** In thermally metamorphosed argillaceous sediments and high-grade regionally metamorphosed schists, gneisses, and granulites; in mafic igneous rocks and granites; detrital.

**Association:** Sillimanite, potassic feldspar, muscovite, biotite, corundum, spinel, garnet, andalusite.

**Distribution:** Widely distributed; some localities for abundant material are: at Bodenmais, Bavaria, Germany. From Orijärvi and Leppävirta, Finland. In Norway, at Kragerö, near Tvedestrand, and Akland, Söndeled, near Risör. In the Mt. Bity district, south of Antsirabe, Madagascar. On the Treasure Casket claims, Fungure Reserve, Zimbabwe. Found around Namib, Namibia. Crystals from the gem gravels of Sri Lanka. Around Tiruchchirappalli and Coimbatore, Tamil Nadu, India. In the Harts Range, Northern Territory, Australia. In the USA, at Richmond, Cheshire Co., New Hampshire; and at Haddam, Middlesex Co., Connecticut. Fine crystals from Thompson, Manitoba, Canada.

**Name:** Honoring Pierre Louis A. Cordier (1777–1861), French mining engineer and geologist, who first studied the species.

**References:** (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 419–421. (2) Deer, W.A., R.A. Howie, and J. Zussman (1986) Rock-forming minerals, (2nd edition), v. 1B, disilicates and ring silicates, 410–540. (3) (1961) NBS Mono. 25, 1, 28. (4) Pryce, M.W. (1973) Low-iron cordierite in phlogopite schist from White Well, Western Australia. *Mineral. Mag.*, 39, 241–243. (5) Cohen, J.P., F.K. Ross, and G.V. Gibbs (1977) An X-ray and neutron diffraction study of low hydrous cordierite. *Amer. Mineral.*, 62, 67–78. (6) Armbruster, T. (1986) Role of Na in the structure of low-cordierite: a single-crystal X-ray study. *Amer. Mineral.*, 71, 746–757.

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