Diopside $CaMgSi_2O_6$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As prismatic crystals with nearly square cross sections, to 50 cm; granular, columnar, lamellar massive. *Twinning:* Simple or multiple twins on {100} or {010}, common.

Physical Properties: *Cleavage:* Distinct on {110}, (110) $\wedge$ $(1\bar{1}0)$ ~87°; partings on {100} and probably {010}. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = 5.5–6.5 D(meas.) = 3.22–3.38 D(calc.) = 3.278

Optical Properties: Transparent to opaque. *Color:* Colorless, white, yellow, pale to dark green, black; colorless in thin section. *Streak:* White, gray, gray-green. *Luster:* Vitreous or dull.
Optical Class: Biaxial (+). *Orientation:* $Y = b$; $Z \wedge c = -38°$ on (010); $X \wedge a = -22°$. *Dispersion:* $r > v$, weak to moderate. $\alpha = 1.664$ $\beta = 1.672$ $\gamma = 1.694$ 2V(meas.) = 59°

Cell Data: *Space Group:* $C2/c$. $a = 9.746$ $b = 8.899$ $c = 5.251$ $\beta = 105.63°$ Z = 4

X-ray Powder Pattern: Schwartzenstein, Austria. (ICDD 11-654).
2.991 (100), 2.528 (40), 2.893 (30), 2.518 (30), 3.23 (25), 2.952 (25), 1.625 (25)

Chemistry:	(1)	(2)		(1)	(2)		(1)	(2)
SiO_2	54.66	54.09	FeO	0.07	1.47	K_2O		0.15
TiO_2		0.28	MnO	0.02	0.09	H_2O^+	0.22	0.22
Al_2O_3	0.07	1.57	MgO	18.78	16.96	H_2O^-		0.08
Fe_2O_3	0.68	0.74	CaO	25.85	21.10	rem.		0.49
Cr_2O_3		2.03	Na_2O		1.37	Total	100.35	100.64

(1) Juva, Finland; corresponds to $Ca_{1.00}(Mg_{1.01}Fe^{3+}_{0.02})_{\Sigma=1.03}Si_{1.98}O_6$. (2) Dutoitspan mine, Kimberley, Cape Province, South Africa; corresponds to $(Ca_{0.82}Na_{0.05}Fe^{2+}_{0.04}Mg_{0.04}K_{0.01})_{\Sigma=0.96}(Mg_{0.88}Cr_{0.06}Al_{0.03}Fe^{3+}_{0.02}Ti_{0.01})_{\Sigma=1.00}(Si_{1.96}Al_{0.04})_{\Sigma=2.00}O_6$.

Polymorphism & Series: Forms two series, with hedenbergite, and with johannsenite.

Mineral Group: Pyroxene group.

Occurrence: Typical of metamorphosed siliceous Ca, Mg-rich rocks of the pyroxene-hornfels or epidote-amphibolite facies; common in skarns, Ca, Mg-rich gneisses and schists, and some kimberlites and peridotites. Less common in alkalic olivine basalts and andesites.

Association: Calcite, forsterite, chondrodite, monticellite, clinohumite, scapolite, wollastonite, grossular, vesuvianite, tremolite, quartz.

Distribution: Selected localities for fine crystals follow: at Schwarzenstein, Zillertal, and near Prägraten, Tirol, Austria. From Ala, Piedmont, and St. Marcel, Val d'Aosta, Italy. At Otokumpu, Finland. In Russia, at the Akhmatovsk deposit, near Zlatoust, Ural Mountains; large crystals in the Inagli massif, 30 km west of Aldan, Yakutia; and along the Slyudyanka River, near Lake Baikal, Siberia. In Canada, many localities; in Ontario, at Bird's Creek, Eganville, Dog's Lake, Littlefield, and Burgess; in Quebec, at Wakefield, Brompton Lake, near Magog, and in the Jeffrey mine, Asbestos. In the USA, at DeKalb, St. Lawrence Co., Natural Bridge, Jefferson Co., Sing Sing, near Ossining, Westchester Co., New York; and at Ducktown, Polk Co., Tennessee. At Ampandrandava and Andranodambo, Taolañaro (Fort Dauphin), Madagascar. Large gemmy crystals from the Kunlun Mountains, Sinkiang Uighur Autonomous Region, China. From Tange-Achin, Kandahar Province, Afghanistan. Found near Jaipur, Rajasthan, India. At Khapalu and Chamachu, Pakistan.

Name: From the Greek for *double* and *appearance*, apparently for two possible orientations of the prism zone.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 351–359.
(2) Deer, W.A., R.A. Howie, and J. Zussman (1978) Rock-forming minerals, (2nd edition), v. 2A, single-chain silicates, 198–293.