

Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. Typically octahedra, rarely as dodecahedra, may be modified by {100} or {011}, to 12 cm; also as exsolution lamellae in other minerals; granular, massive. *Twining:* On {111} as both twin and composition plane, common.

Physical Properties: *Cleavage:* Parting {111}, indistinct. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 7.5–8 D(meas.) = 4.38–4.60 D(calc.) = 4.607

Optical Properties: Translucent to nearly opaque. *Color:* Dark green, bluish green, blue to indigo, yellow to brown; in transmitted light, pale green; in reflected light, bluish green to green internal reflections. *Streak:* Gray. *Luster:* Vitreous. *Optical Class:* Isotropic. $n = 1.79$ – 1.80

Cell Data: *Space Group:* $Fd\bar{3}m$ (synthetic). $a = 8.0872(1)$ $Z = 8$

X-ray Powder Pattern: Synthetic.

2.438 (100), 2.861 (84), 1.429 (43), 1.556 (40), 1.650 (24), 0.8251 (13), 1.0525 (12)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
SiO ₂	0.03	0.06		MnO	0.65	0.46	
TiO ₂	0.00	0.00		ZnO	34.06	19.88	44.39
Al ₂ O ₃	57.71	60.80	55.61	MgO	0.61	7.33	
FeO	7.85	12.09		Total	100.91	100.62	100.00

(1) Desolation Row pluton, Victoria Range, New Zealand; by electron microprobe, total Fe as FeO; corresponding to $(Zn_{0.75}Fe_{0.19}Mg_{0.03}Mn_{0.02})_{\Sigma=0.99}(Al_{2.01}Si_{0.01})_{\Sigma=2.02}O_4$. (2) Geco mine, Canada; by electron microprobe, average of six points, total Fe as FeO; corresponding to $(Zn_{0.41}Mg_{0.30}Fe_{0.28}Mn_{0.01})_{\Sigma=1.00}Al_{1.99}O_{32}$. (3) ZnAl₂O₄.

Polymorphism & Series: Forms two series, with spinel, and with hercynite.

Mineral Group: Spinel group.

Occurrence: An accessory mineral in granites and granite pegmatites; in medium- to high-grade metamorphic rocks and metamorphosed base-metal sulfide deposits; in diasporites, formed by the low-grade metamorphism of bauxites; a detrital mineral in placers.

Association: Rhodonite, franklinite, calcite, andradite, willemite (Franklin, New Jersey, USA); corundum, pyrrhotite, hōgbomite, nigerite, phlogopite, staurolite, cordierite, pyrite, chalcopyrite (Geco mine, Canada).

Distribution: Many localities, but most with small crystals. Abundant at Falun, Sweden. From the Silberberg mine, near Bodenmais, Bavaria, Germany. At Tiriolo, near Catanzaro, Calabria, Italy. In the USA, large crystals from Franklin and Sterling Hill, Ogdensburg, Sussex Co., New Jersey; at the Mineral Hill and Patapsco mines, Carroll Co., Maryland; in the Deake and Chalk Mountain mines, Mitchell Co., North Carolina; in the Cotopaxi mine, Fremont Co., Colorado. In Canada, found at the Geco mine, Manitouwadge, Ontario; in Hudson township, Quebec; and elsewhere. In Brazil, from the Alto do Giz pegmatite, near Parelhas, Rio Grande do Norte. At Ambatofotsikely, Madagascar. From Otjiwarango, Namibia. At Jemaa, Nigeria. From Broken Hill, New South Wales; at Wodgina and Greenbushes, Western Australia. In New Zealand, occurs in the Victoria Range, Nelson.

Name: For the Swedish chemist and mineralogist, Johan Gottlieb Gahn (1745–1818), who discovered the mineral.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 689–697. (2) Tulloch, A.J. (1981) Gahnite and columbite in an alkali-feldspar granite from New Zealand. *Mineral. Mag.*, 44, 275–278. (3) Spry, P.G. (1982) An unusual gahnite-forming reaction, Geco base-metal deposit, Manitouwadge, Ontario. *Can. Mineral.*, 20, 549–553. (4) O'Neill, H.St.C. and W.A. Dollase (1994) Crystal structures and cation distributions in simple spinels from powder XRD structural refinements: MgCr₂O₄, ZnCr₂O₄, Fe₃O₄ and the temperature dependence of the cation distribution in ZnAl₂O₄. *Phys. Chem. Minerals*, 20, 541–555. (5) (1953) NBS Circ. 539, 2, 38.

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