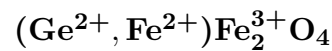


# Brunogeierite



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**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . Very rare crystals, to 5 mm; usually as crusts, or as rims incrusting tennantite enclosing reinierite; as inclusions in sphalerite and magnetite.

**Physical Properties:** Hardness = 5 D(meas.) = n.d. D(calc.) = 5.51 Ferromagnetic.

**Optical Properties:** Opaque. *Color:* Gray, with brownish internal reflections in reflected light.

*Optical Class:* Isotropic.

R: (400) 15.5, (420) 15.0, (440) 14.5, (460) 14.1, (480) 13.8, (500) 13.6, (520) 13.4, (540) 13.3, (560) 13.2, (580) 13.1, (600) 13.0, (620) 13.0, (640) 12.9, (660) 12.8, (680) 12.8, (700) 12.8

**Cell Data:** *Space Group:*  $Fd\bar{3}m$ .  $a = 8.409\text{--}8.416$   $Z = 8$

**X-ray Powder Pattern:** Tsumeb, Namibia.

2.540 (10), 1.484 (9), 1.615 (7), 2.972 (6), 1.095 (6), 1.720 (4), 1.283 (3)

<b>Chemistry:</b>	(1)	(2)	(3)	(4)
GeO <sub>2</sub>	37.0	40.5	42.13	35.69
Fe <sub>2</sub> O <sub>3</sub>				64.31
FeO	63.8	60.7	57.87	
Total	100.8	101.2	100.00	100.00

(1) Tsumeb, Namibia; by electron microprobe, total Fe as FeO; corresponding to  $(\text{Ge}_{0.87}\text{Fe}_{0.13}^{2+})_{\Sigma=1.00}\text{Fe}_2^{3+}\text{O}_4$ . (2) Do.; total Fe as FeO; corresponding to  $(\text{Ge}_{0.95}\text{Fe}_{0.05}^{2+})_{\Sigma=1.00}\text{Fe}_2^{3+}\text{O}_4$ . (3)  $\text{GeFe}_2^{3+}\text{O}_4$ , with Fe reported as  $\text{Fe}^{2+}$ . (4)  $\text{GeFe}_2^{3+}\text{O}_4$ , with Fe reported as  $\text{Fe}^{3+}$ .

**Mineral Group:** Spinel group.

**Occurrence:** In the lower oxidation zone of a dolostone-hosted hydrothermal polymetallic ore deposit, at a depth of 930 meters (Tsumeb, Namibia).

**Association:** Tennantite, reinierite, zincian stottite (Tsumeb, Namibia); sphalerite, magnetite (France).

**Distribution:** From Tsumeb, Namibia. In France, from many deposits in the central Pyrénées, as at Caufkens, Ariège; Carboire, Couledoux, Estaing, and Pal Bidao, Haute-Garonne; and elsewhere.

**Name:** For Dr. Bruno H. Geier (1902–1987), formerly Chief Mineralogist, Tsumeb Corporation, Tsumeb, Namibia.

**Type Material:** n.d.

**References:** (1) Ottemann, J. and B. Nuber (1972) Brunogeierit, ein Germanium-Ferritspinell von Tsumeb. *Neues Jahrb. Mineral., Monatsh.*, 263–267 (in German with English abs.). (2) (1973) *Amer. Mineral.*, 58, 348 (abs. ref. 1). (3) Johan, Z., E. Oudin, and P. Picot (1983) Analogues germanifères et gallifères des silicates et oxydes dans les gisements de zinc des Pyrénées centrales, France; argutite et carboirite, deux nouvelles espèces minérales. *Tschermaks Mineral. Petrog. Mitt.*, 31, 97–119 (in French with English abs.).