

Bredigite

Ca₇Mg(SiO₄)₄

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Crystal Data: Orthorhombic, pseudo-hexagonal. *Point Group:* *mm*2. Crystals are squat, barrel- or boat-shaped, with pseudo-hexagonal cross sections, or as slender prismatic crystals, to 2 mm; also as rounded grains. *Twinning:* Simple contact and cyclical on {110}.

Physical Properties: *Cleavage:* Distinct on {130}. *Hardness* = n.d. *D*(meas.) = 3.42
D(calc.) = [3.32]

Optical Properties: Transparent. *Color:* Colorless, gray. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Pleochroism:* In thick sections, *X* = pale violet; *Y* = *Z* = colorless to pale green. *Orientation:* *X* = *b*; *Y* = *a*; *Z* = *c*. $\alpha = 1.712\text{--}1.725$ $\beta = 1.716\text{--}1.728$
 $\gamma = 1.725\text{--}1.740$ *2V*(meas.) = 10°–34°

Cell Data: *Space Group:* *P*2*nn*. *a* = 10.909(9) *b* = 18.34(1) *c* = 6.739(9) *Z* = 4

X-ray Powder Pattern: Scawt Hill, Ireland.
2.730 (100), 2.663 (100), 2.259 (80), 1.923 (80), 2.067 (60), 1.574 (60), 1.554 (60)

Chemistry:	(1)	(2)	(3)
SiO ₂	33.08	36.6	35.70
TiO ₂	0.34		
Fe ₂ O ₃	0.12		
MnO	3.38		
MgO	6.78	5.1	5.99
CaO	49.23	59.9	58.31
BaO	6.91		
F	0.16		
Total	100.00	[101.6]	100.00

(1) Synthetic, sample separated from slag; recalculated after deducting impurities. (2) Scawt Hill, Ireland; by electron microprobe, original analysis Si 17.1%, Mg 3.1%, Ca 42.8%, here converted to oxides, traces of Na, Al, P, S. (3) Ca₇Mg(SiO₄)₄.

Occurrence: In contact metamorphosed limestones and dolostones intruded by diabase (Scawt Hill, Ireland) or syenite monzonite (Marble Canyon, Texas, USA).

Association: Larnite, spurrite, gehlenite, melilite, perovskite, magnetite (Scawt Hill, Ireland).

Distribution: In the USA, at Marble Canyon, Culberson Co., Texas. In Ireland, at Scawt Hill and Ballycraigy, near Larne, Co. Antrim. At Camas Mòr, Isle of Muck, Inverness-shire, and at Camphouse, Ardnamurchan, Argyllshire, Scotland. In the Hatrurim Formation, Israel.

Name: For Max Albrecht Bredig (1902–), physical chemist, who studied the polymorphism of Ca₂SiO₄.

Type Material: The Natural History Museum, London, England, 1956,385.

References: (1) Tilley, C.E. and H.C.G. Vincent (1948) The occurrence of an orthorhombic high-temperature form of Ca₂SiO₄ (bredigite) in the Scawt Hill contact-zone and as a constituent of slags. *Mineral. Mag.*, 28, 255–271. (2) (1948) *Amer. Mineral.*, 33, 786 (abs. ref. 1). (3) Douglas, A.M.B. (1951) X-ray investigation of bredigite. *Mineral. Mag.*, 29, 875–884. (4) Bridge, T.E. (1966) Bredigite, larnite, and γ dicalcium silicates from Marble Canyon. *Amer. Mineral.*, 51, 1766–1774. (5) Moore, P.B. and T. Araki (1976) The crystal structure of bredigite and the genealogy of some alkaline earth orthosilicates. *Amer. Mineral.*, 61, 74–87. (6) Sarkar, S.L. and J.W. Jeffrey (1978) Electron microprobe analysis of Scawt Hill bredigite-larnite rock. *J. Amer. Ceramic Soc.*, 61, 177–178. (7) Heller, L. and H.F.W. Taylor (1956) Crystallographic data for the calcium silicates. H.M. Stationary Office, London, 14.

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