Gehlenite $Ca_2Al(AlSi)O_7$

Crystal Data: Tetragonal. *Point Group:* $\bar{4}2m$. Crystals are commonly short prismatic, resembling octahedrally modified cubes; granular, massive. *Twinning:* On {100}, {001}; lamellar on {001}.

Physical Properties: *Cleavage:* Distinct on {001}, poor on {110}. *Fracture:* Uneven, splintery to conchoidal. *Tenacity:* Brittle. Hardness = 5–6 D(meas.) = 3.038 D(calc.) = 3.03

Optical Properties: Transparent to translucent and opaque. *Color:* Colorless, brown, yellowish, greyish green; colorless to pale yellow in thin section. *Streak:* White to grayish white. *Luster:* Vitreous to resinous.
Optical Class: Uniaxial (–). *Pleochroism:* May show anomalous Berlin blue interference colors. *Absorption:* Weak; $O > E$. $\omega = 1.669$ (synthetic). $\epsilon = 1.658$

Cell Data: *Space Group:* $P\bar{4}2_1m$ (synthetic). $a = 7.6850(4)$ $c = 5.0636(3)$ Z = 2

X-ray Powder Pattern: Crestmore, California, USA.
2.848 (100), 1.818 (75), 1.921 (64), 3.066 (43), 2.437 (38), 1.768 (36), 2.738 (32)

Chemistry:

	(1)	(2)	(3)
SiO_2	30.09	22.86	21.91
TiO_2	trace		
Al_2O_3	21.67	32.09	37.19
Fe_2O_3	1.36	3.03	
FeO	2.14		
MnO	0.04		
MgO	3.87	0.85	
CaO	38.36	41.25	40.90
Na_2O	0.75		
K_2O	0.16		
H_2O^+	1.64		
Total	100.08	100.08	100.00

(1) Val di Fassa, Italy. (2) Carneal, Ireland; by electron microprobe. (3) $Ca_2Al(AlSi)O_7$.

Polymorphism & Series: Forms a series with åkermanite.

Mineral Group: Melilite group.

Occurrence: In contact metamorphosed impure limestones; in calcium-rich ultramafic volcanic rocks.

Association: Dolomite, calcite, augite, olivine, nepheline, leucite, merwinite, spurrite, diopside, ferroan spinel, phlogopite, pyrope, grossular, antigorite, pyroxenes, apatite, vesuvianite.

Distribution: Occurrences are typically of intermediate series members. Relatively pure examples have been found at: Mt. Monzoni, Val di Fassa, and Canzòcoli, Val di Fiemme, Trentino-Alto Adige, Italy. On Scawt Hill, near Larne, and at Carneal, Co. Antrim, Ireland. At Camas Mòr, Isle of Muck, and Camphouse, Ardnamurchan, Argyllshire, Scotland. From the Bellerberg volcano, two km north of Mayen, Eifel district, Germany. In the USA, at Crestmore, Riverside Co., California; from the Tres Hermanas district, Luna Co., New Mexico; and at Iron Hill, Gunnison Co., Colorado. From the Terneras mine, Velardeña, Durango, Mexico.

Name: After the German chemist, Adolf Ferdinand Gehlen (1775–1815).

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 476–477. (2) Deer, W.A., R.A. Howie, and J. Zussman (1986) Rock-forming minerals, (2nd edition), v. 1B, disilicates and ring silicates, 285–334. (3) Sabine, P.A., M.T. Styles, and B.R. Young (1982) Gehlenite, an exomorphic mineral from Carneal, Co. Antrim, Northern Ireland. U.K. Inst. of Geol. Sci., Report 82-1, 61–63. (4) (1982) Mineral. Abs., 33, 297 (abs. ref. 3). (5) Swainson, I.P., M.T. Dove, W.S. Schmahl, and A. Putnis (1992) Neutron powder diffraction study of the åkermanite–gehlenite solid solution series. Phys. Chem. Minerals, 19, 185–195.