Grossite $CaAl_4O_7$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As lathlike or subhedral rounded grains, to 30 μ; in polycrystalline aggregates rimmed by melilite.

Physical Properties: Hardness = n.d. D(meas.) = n.d. D(calc.) = 2.88

Optical Properties: Transparent. *Color:* White to colorless. *Streak:* White.
Luster: Vitreous.
Optical Class: Biaxial (+); low birefringence. *Orientation:* Elongation negative. $n = < 1.730$
$\alpha = 1.6178(3)$ (synthetic). $\beta = 1.6184(3)$ $\gamma = 1.6516(3)$ 2V(meas.) = 12(1)°
2V(calc.) = 15.5°

Cell Data: *Space Group:* $C2/c$. a = 12.94(1) $b = 8.910(8)$ $c = 5.446(4)$ $\beta = 107.0(1)°$
Z = 4

X-ray Powder Pattern: Acfer 182 meteorite.
3.515 (100), 4.460 (43), 2.605 (36), 2.440 (21), 1.764 (20), 3.609 (13), 2.882 (13)

Chemistry:

	(1)	(2)
SiO_2	0.11	
TiO_2	0.15	
Al_2O_3	77.8	78.43
FeO	0.31	
MgO	0.06	
CaO	21.4	21.57
Total	99.83	100.00

(1) Acfer 182 meteorite; by electron microprobe, average of 20 grains; corresponding to $(Ca_{1.00}Fe_{0.01})_{\Sigma=1.01}Al_{3.99}O_7$. (2) $CaAl_4O_7$.

Occurrence: In argillaceous limestones metamorphosed at high temperature and low pressure (Hatrurim Formation, Israel); in Ca–Al-rich inclusions thought formed by condensation from a hot gas or molten droplets (meteorites).

Association: Brownmillerite, mayenite, larnite (Hatrurim Formation, Israel); perovskite, melilite, hibonite, spinel, calcian pyroxene (meteorites).

Distribution: In the Hatrurim Formation, Israel. From the chondritic meteorites Acfer 182, Acfer 059-El Djouf 001, ALH85085, and others.

Name: Honors Dr. Shulamit Gross (1923–), Geological Survey of Israel, Jerusalem, Israel, who noted the species in the Hatrurim Formation, Israel.

Type Material: Institute for Planetology, Münster; Natural History Museum, Humboldt University, Berlin, Germany.

References: (1) Weber, D. and A. Bischoff (1994) Grossite ($CaAl_4O_7$) – a rare phase in terrestrial rocks and meteorites. Eur. J. Mineral., 6, 591–594. (2) (1995) Amer. Mineral., 80, 630 (abs. ref. 1). (3) Gross, S. (1977) The mineralogy of the Hatrurim Formation, Israel. Geol. Sur. Israel Bull. 70, 11. (4) Boyko, E.R. and L.G. Wisnyi (1958) The optical properties and structures of $CaO \cdot 2Al_2O_3$ and $SrO \cdot 2Al_2O_3$. Acta Cryst., A11, 444–445.