Mayenite $Ca_{12}Al_{14}O_{33}$

Crystal Data: Cubic. *Point Group:* $\bar{4}3m$ (synthetic). In rounded anhedral grains, to 60 μm.

Physical Properties: Hardness = n.d. D(meas.) = 2.85 D(calc.) = [2.67] Alters immediately to hydrated calcium aluminates on exposure to H_2O.

Optical Properties: Transparent. *Color:* Colorless.
Optical Class: Isotropic. n = 1.614–1.643

Cell Data: *Space Group:* $I\bar{4}3d$ (synthetic). a = 11.97–12.02 Z = 2

X-ray Powder Pattern: Near Mayen, Germany.
2.69 (vs), 4.91 (s), 2.45 (ms), 3.00 (m), 2.19 (m), 1.95 (m), 1.66 (m)

Chemistry:

	(1)	(2)	(3)
SiO_2		0.4	
Al_2O_3	45.2	49.5	51.47
Fe_2O_3	2.0	1.5	
MnO		1.4	
CaO	45.7	47.0	48.53
LOI	2.2		
Total	95.1	99.8	100.00

(1) Near Mayen, Germany; by semiquantitative spectroscopy. (2) Hatrurim Formation, Israel; by electron microprobe, corresponding to $(Ca_{11.7}Mg_{0.5})_{\Sigma=12.2}(Al_{13.5}Fe_{0.25}Si_{0.10})_{\Sigma=13.85}O_{33}$. (3) $Ca_{12}Al_{14}O_{33}$.

Occurrence: In thermally metamorphosed limestone blocks included in volcanic rocks (near Mayen, Germany); common in high-temperature, thermally metamorphosed, impure limestones (Hatrurim Formation, Israel).

Association: Calcite, ettringite, wollastonite, larnite, brownmillerite, gehlenite, diopside, pyrrhotite, grossular, spinel, afwillite, jennite, portlandite, jasmundite (near Mayen, Germany); melilite, wollastonite, kalsilite, brownmillerite, corundum (Klöch, Austria); spurrite, larnite, grossite, brownmillerite (Hatrurim Formation, Israel).

Distribution: From the Ettringer-Bellerberg volcano, near Mayen, Eifel district, Germany. Found at Klöch, Styria, Austria. In the Hatrurim Formation, Israel. From Kopeysk, Chelyabinsk coal basin, Southern Ural Mountains, Russia.

Name: For Mayen, Germany, near where the mineral was first described.

Type Material: Mineral Museum, University of Cologne, Cologne, Germany, M5026/86; National Museum of Natural History, Washington, D.C., USA, 120045.

References: (1) Hentschel, G. (1964) Mayenit, $12CaO{\bullet}7Al_2O_3$, und Brownmillerit, $2CaO{\bullet}(Al,Fe)_2O_3$, zwei neue Minerale in den Kalksteineinschlüssen der Lava des Ettringer Bellerberges. Neues Jahrb. Mineral., Monatsh., 22–29 (in German with English abs.). (2) (1965) Amer. Mineral., 50, 2106–2107 (abs. ref. 1). (3) Gross, S. (1977) The mineralogy of the Hatrurim Formation, Israel. Geol. Sur. Israel Bull. 70, 10–11.