Meionite 3CaAl$_2$Si$_2$O$_8$·CaCO$_3$

Crystal Data: Tetragonal. Point Group: 4/m. Crystals prismatic, typically with flat pyramidal terminations, striated || [001], to 0.7 m; granular, massive.

Physical Properties: \textbf{Cleavage:} \{100\}, \{110\}; distinct. \textbf{Fracture:} Uneven to conchoidal. \textbf{Tenacity:} Brittle. Hardness = 5–6 D(meas.) = 2.74–2.78 D(calc.) = [2.86] Commonly fluoresces orange to bright yellow or red under LW or SW UV or both.

Optical Properties: Transparent to opaque. \textbf{Color:} Colorless, white, grey; pink, violet, blue, yellow, orange-brown, brown; colorless in thin section. \textbf{Streak:} White. \textbf{Luster:} Vitreous to pearly or resinous. \textbf{Optical Class:} Uniaxial (−). $\omega = 1.590–1.600 \ e = 1.556–1.562$

Cell Data: Space Group: I4/m (synthetic). $a = 12.179(1) \ c = 7.571(1) \ Z = 2$

X-ray Powder Pattern: Bolton, Massachusetts, USA. (ICDD 2-405). 3.47 (100), 3.08 (100), 2.07 (100), 2.73 (80), 1.91 (80), 1.37 (80), 3.87 (70)

Chemistry: (1) SiO$_2$ 41.38 Cl 0.18
Al$_2$O$_3$ 31.59 H$_2$O$^+$ 0.29
MgO 0.29 CO$_2$ 4.35
CaO 20.72 SO$_3$ 0.35
Na$_2$O 1.38 $-O = (F,Cl)_2$ 0.04
K$_2$O 0.48 Total 100.97

(1) Vesuvius, Campania, Italy; corresponds to (Ca$_{3.39}$Na$_{0.41}$K$_{0.09}$Mg$_{0.07}$)$_{\Sigma=3.96}$
(Si$_{0.32}$Al$_{5.68}$)$_{\Sigma=12}$O$_{24}$[(CO$_3$)$_{0.91}$Cl$_{0.05}$SO$_4$)$_{0.04}$]$_{\Sigma=1.00}$

Polymorphism & Series: Forms a series with marialite; intermediate members are P4$_2$/n.

Mineral Group: Scapolite group.

Occurrence: Typically in regionally metamorphosed rocks, especially marbles, calcareous gneisses, granulites, and greenschists. Also in skarns, some pegmatites, pneumatolytically or hydrothermally altered mafic igneous rocks, and ejected volcanic blocks.

Association: Plagioclase, garnet, pyroxenes, amphiboles, apatite, titanite, zircon.

Distribution: Most specimens are intermediate in the series, see also marialite; some localities for highly calcic material include: at Monte Somma and Vesuvius, Campania, Italy. Around the Laacher See, Eifel district, Germany. From Pargas and Pusunsaari, Finland. At Slyudyanka, near Lake Baikal, Siberia, Russia. From Gooderham, Ontario, and Grenville, Quebec, Canada. At Rossie, St. Lawrence Co., New York; Bolton, Worcester Co., Massachusetts; and Cutcane Creek, Fannin Co., Georgia, USA.

Name: From the Greek for less, referring to its less acute pyramidal form compared with vesuvianite.

Type Material: Natural History Museum, Paris, France, 3774.