

Margarite

CaAl₂(Al₂Si₂)O₁₀(OH)₂

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Crystal Data: Monoclinic. *Point Group:* 2/m. Rarely forms distinct thin tabular crystals, with pseudohexagonal outline; commonly foliated micaceous aggregates, with lamellae to 3 cm; massive. *Twinning:* On composition plane {001}, with twin axis [310].

Physical Properties: *Cleavage:* {001}, perfect. *Tenacity:* Laminae brittle. Hardness = 3.5–4.5 D(meas.) = 2.99–3.08 D(calc.) = 3.077

Optical Properties: Translucent. *Color:* Grayish, pale pink, yellow, or green; colorless in thin section. *Streak:* White. *Luster:* Pearly on cleavage, vitreous on lateral faces.

Optical Class: Biaxial (-). *Orientation:* Z = b; X ∧ c = 11°–13°; Y ∧ a = 6°–8°. *Dispersion:* r < v, distinct. α = 1.630–1.638 β = 1.642–1.648 γ = 1.644–1.650 2V(meas.) = 40°–67°

Cell Data: *Space Group:* C2/c. a = 5.10 b = 8.83 c = 19.15 β = 95.5° Z = 4

X-ray Powder Pattern: Shin-Kiura mine, Japan. 3.180 (100), 1.908 (35), 2.517 (25), 2.508 (18), 1.903 (18), 1.466 (16), 3.123 (14)

| Chemistry: | (1) | (2) | (1) | (2) | |
|--------------------------------|-------|-------|-------------------------------|--------|----------|
| SiO ₂ | 31.98 | 32.59 | CaO | 10.64 | 9.79 |
| Al ₂ O ₃ | 49.21 | 50.33 | Na ₂ O | 1.53 | 1.96 |
| FeO | 0.79 | 0.24 | K ₂ O | 0.21 | 0.48 |
| MgO | 0.76 | | H ₂ O ⁺ | 4.95 | [4.61] |
| | | | Total | 100.07 | [100.00] |

(1) Unionville, Pennsylvania, USA; corresponds to (Ca_{0.75}Na_{0.21}K_{0.02})_{Σ=0.98}(Al_{1.96}Mg_{0.07}Fe_{0.04})_{Σ=2.07}(Si_{2.10}Al_{1.90})_{Σ=4.00}O₁₀(OH)_{2.18}. (2) Fettercairn, Scotland; by electron microprobe, H₂O by difference; corresponds to (Ca_{0.69}Na_{0.25}K_{0.04})_{Σ=0.98}Al_{2.05}(Si_{2.15}Al_{1.85}Fe_{0.03})_{Σ=4.03}O₁₀(OH)₂.

Polymorphism & Series: 2M₁ polytype.

Mineral Group: Mica group.

Occurrence: From low- to medium-grade metamorphic rocks, as in emery deposits, chlorite and mica schists, and glaucophane-bearing rocks.

Association: Corundum, diaspore, tourmaline, staurolite, glaucophane, chlorite, magnetite, spinel, andalusite, calcite, quartz.

Distribution: On Mt. Greiner, in the Zillertal, Tirol, Austria. On Mákares and Naxos Islands, Greece. From Yekaterinburg (Sverdlovsk), Ural Mountains, Russia. In the USA, from Chester, Hampden Co., Massachusetts; Cruger's Point, Peekskill, Putnam Co., New York; Franklin and Sterling Hill, Ogdensburg, Sussex Co., New Jersey; on Corundum Hill, Chester Co., and Village Green, Delaware Co., Pennsylvania; at Bull Mountain, Patrick Co., Virginia. In California, from Meadow Valley, Plumas Co., and Hilton Gulch, Oak Ridge, Santa Clara Co. At Glen Esk and Fettercairn, Scotland. In the Shin-Kiura mine, Oita Prefecture, Japan.

Name: From the Greek for *pearl*, for its pearly luster on cleavage.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 636–637. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 3, sheet silicates, 95–98. (3) Aoki, Y. and N. Shimada (1965) Margarite from the Shin-Kiura mine, Oita Prefecture. J. Mineral. Soc. Japan, 7, 87–93 (in Japanese). (4) Guggenheim, S. and S.W. Bailey (1975) Refinement of the margarite structure in subgroup symmetry. Amer. Mineral., 60, 1023–1029. (5) Guggenheim, S. and S.W. Bailey (1978) Refinement of the margarite structure in subgroup symmetry: correction, further refinement, and comments. Amer. Mineral., 63, 186–187. (6) Baltatzis, E. and C. Katagas (1981) Margarite pseudomorphs after kyanite in Glen Esk, Scotland. Amer. Mineral., 66, 213–216.

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