

Paragonite

NaAl₂(Si₃Al)O₁₀(OH)₂

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Crystal Data: Monoclinic; hexagonal in part. *Point Group:* $2/m$ or m . Crystals thin tabular || {001}; commonly fine scaly, compact, massive. *Twining:* By rotation of 180° about [310] or $[3\bar{1}0]$.

Physical Properties: *Cleavage:* {001}, perfect. *Tenacity:* Flexible, elastic. Hardness = 2.5–3 D(meas.) = 2.85 D(calc.) = 2.907

Optical Properties: Transparent to translucent. *Color:* Colorless, pale yellow, grayish, grayish white, greenish, light apple-green; colorless in thin section, may show faint color tint. *Luster:* Pearly.

Optical Class: Biaxial (-). *Orientation:* $Y \simeq a$; $Z = b$; $X \wedge c \simeq 5^\circ$. *Dispersion:* $r > v$. *Absorption:* Very faint; $Z \geq Y > X$. $\alpha = 1.564$ – 1.580 $\beta = 1.594$ – 1.609 $\gamma = 1.600$ – 1.609 $2V(\text{meas.}) = 0^\circ$ – 40°

Cell Data: *Space Group:* $C2/c$ ($2M_1$). $a = 5.13(3)$ $b = 8.89(5)$ $c = 19.32(10)$
 $\beta = 95^\circ 10(30)'$ $Z = 4$

X-ray Powder Pattern: Pizzo Forno, Switzerland; $2M_1$.
4.44 (100), 2.536 (90), 9.7 (80), 2.430 (80), 1.486 (80b), 2.921 (70), 2.831 (70)

Chemistry:	(1)	(2)	(1)	(2)	(1)	(2)
SiO ₂	46.81	45.95	FeO	0.53	BaO	0.01
TiO ₂		0.07	MnO	trace	Na ₂ O	6.40
Al ₂ O ₃	40.06	40.47	MgO	0.65	K ₂ O	0.51
Fe ₂ O ₃	trace		CaO	1.26	H ₂ O ⁺	4.82
					Total	100.00
						[100.00]

(1) Pizzo Forno, Switzerland; corresponds to $(\text{Na}_{0.79}\text{Ca}_{0.09})_{\Sigma=0.88}(\text{Al}_{1.97}\text{Mg}_{0.06})_{\Sigma=2.03}(\text{Si}_{2.97}\text{Al}_{1.03})_{\Sigma=4.00}\text{O}_{10}(\text{OH})_2$. (2) Zermatt-Saas region, Switzerland; by electron microprobe, average of four analyses, H₂O by difference; corresponding to $(\text{Na}_{0.92}\text{K}_{0.04}\text{Ca}_{0.02})_{\Sigma=0.98}(\text{Al}_{1.99}\text{Fe}_{0.03}\text{Mg}_{0.01})_{\Sigma=2.03}(\text{Si}_{2.94}\text{Al}_{1.06})_{\Sigma=4.00}\text{O}_{10}(\text{OH})_2$.

Polymorphism & Series: $2M_1$, 3A polytypes.

Mineral Group: Mica group.

Occurrence: Uncommon, but may be in large amounts, in low- to medium-grade metamorphic schists and phyllites, in muscovite-biotite gneisses, quartz veins, fine-grained sediments, and glaucophane-bearing rocks.

Association: Kyanite, staurolite, muscovite, quartz, glaucophane, chlorite, garnet, tourmaline, calcite, actinolite.

Distribution: A few well-studied occurrences follow. On Pizzo Forno, Ticino, and in Val Täsch, Zermatt, Valais, Switzerland. From Prägraten, Tirol, Austria. At Ochsenkopf, Schwarzenberg, Saxony, Germany. In Italy, at Borgofrance, near Ivrea, Piedmont, and in the Pfitschtal, Trentino-Alto Adige. From Miass, Ilmen Mountains, Southern Ural Mountains, Russia. In the Ivigtut cryolite deposit, southwestern Greenland. In the USA, from Corundum Hill, Chester Co., Pennsylvania; in the Leadville district, Lake Co., Colorado.

Name: From the Greek, *paragon*, for *misleading*, as it looks like talc.

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