

## Analcime

## NaAlSi<sub>2</sub>O<sub>6</sub>•H<sub>2</sub>O

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**Crystal Data:** Cubic; tetragonal, orthorhombic, or monoclinic, pseudocubic, with degree of ordering. *Point Group:*  $4/m\bar{3}2/m$ ;  $4/m2/m2/m$ ,  $2/m2/m2/m$ , or  $2/m$ . Crystals commonly trapezohedra {211}, to 25 cm. Also granular, compact, massive, typically showing concentric structure. *Twining:* Polysynthetic on {001}, {110}.

**Physical Properties:** *Cleavage:* Very poor on {100}. *Fracture:* Subconchoidal.

*Tenacity:* Brittle. Hardness = 5–5.5 D(meas.) = 2.24–2.29 D(calc.) = 2.271 Weakly piezoelectric; weakly electrostatic when rubbed or heated.

**Optical Properties:** Transparent to translucent. *Color:* White, colorless, gray, pink, greenish, yellowish; in thin section, colorless. *Luster:* Vitreous.

*Optical Class:* Isotropic; anomalously biaxial (–).  $n = 1.479$ – $1.493$   $2V(\text{meas.}) = 0^\circ$ – $85^\circ$

**Cell Data:** *Space Group:*  $Ia3d$ ;  $I4_1/acd$ ,  $Ibca$ , or  $I2/a$ .  $a = 13.723$ – $13.733$   $Z = 16$  (cubic).

**X-ray Powder Pattern:** Låven Island, Langesundsfjord, Norway.  
3.43 (10), 5.61 (8), 2.925 (8), 1.743 (6), 2.693 (5), 2.505 (5), 1.903 (5)

<b>Chemistry:</b>	(1)	(2)	(3)		(1)	(2)	(3)
SiO <sub>2</sub>	54.19	54.58	54.58	Na <sub>2</sub> O	11.08	13.50	14.08
Al <sub>2</sub> O <sub>3</sub>	23.12	23.05	23.16	K <sub>2</sub> O	1.62	0.00	
MgO	0.10	0.10		H <sub>2</sub> O <sup>+</sup>	8.20	8.70	8.18
CaO	1.54	0.45		Total	99.85	100.38	100.00

(1) Cyclopean Islands, Italy. (2) Mazé, Niigata Prefecture, Japan. (3) NaAlSi<sub>2</sub>O<sub>6</sub>•H<sub>2</sub>O.

**Polymorphism & Series:** Forms a series with pollucite.

**Mineral Group:** Zeolite group.

**Occurrence:** In the groundmass or vesicles of silica-poor intermediate and mafic igneous rocks, typically basalts and phonolites, from late-stage hydrothermal solutions, or disseminated due to deuteric alteration. In lake beds, altered from pyroclastics or clays, or as a primary precipitate; authigenic in sandstones and siltstones.

**Association:** Zeolites, prehnite, calcite, quartz, glauconite.

**Distribution:** Some localities for outstanding specimens follow. In Italy, at Aci Castello, Cyclopean Islands, and from Val di Fassa and Alpe di Siusi, Trentino-Alto Adige. Large crystals from Kotchechovmo, Krasnoyarski Territory, Russia. At Breidhdalsheidhi, Iceland. In the Dean quarry, St. Keverne, Lizard Peninsula, Cornwall, England. Around Glasgow, Dumbartonshire, Scotland. In the USA, from the Lake Superior district, Houghton Co., Michigan; at Cornwall, Lebanon Co., Pennsylvania; from Bergen Hill, Hudson Co., and West Paterson, Passaic Co., New Jersey; on Table Mountain, Jefferson Co., Colorado; in the Price Creek quarry, Benton Co., Oregon. From the Bay of Fundy district, Nova Scotia; large crystals from Mont Saint-Hilaire, Quebec, Canada. From Flinders, Victoria, Australia.

**Name:** From the Greek for weak, alluding to the weak electrostatic charge developed when heated or rubbed.

**Type Material:** Natural History Museum, Paris, France, 13.77, H4154.

**References:** (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 595–598. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 338–350. (3) Saha, P. (1959) Geochemical and X-ray investigations of natural and synthetic analcites. *Amer. Mineral.*, 44, 300–313. (4) Černý, P. (1974) The present status of the analcime-pollucite series. *Can. Mineral.*, 12, 334–341. (5) Coombs, D.S. (1955) X-ray investigations on wairakite and non-cubic analcime. *Mineral. Mag.*, 30, 699. (6) Mazzi, F. and E. Galli (1978) Is each analcime different? *Amer. Mineral.*, 63, 448–460. (7) Pechar, F. (1988) The crystal structure of natural monoclinic analcime (NaAlSi<sub>2</sub>O<sub>6</sub>•H<sub>2</sub>O). *Zeits. Krist.*, 184, 63–69.

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