

# Wairakite

# CaAl<sub>2</sub>Si<sub>4</sub>O<sub>12</sub>•2H<sub>2</sub>O

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**Crystal Data:** Monoclinic, pseudocubic. *Point Group:* 2/m. Subhedral trapezohedral crystals, to 1.5 cm; also as incrustations. *Twinning:* Lamellar on {110}, common.

**Physical Properties:** *Cleavage:* Two sets of possible partings intersecting at 90°. *Tenacity:* Brittle. Hardness = 5.5–6 D(meas.) = 2.26 D(calc.) = 2.272

**Optical Properties:** Transparent to translucent. *Color:* Colorless to white; colorless in thin section. *Luster:* Vitreous to nearly dull.

*Optical Class:* Biaxial. *Orientation:* X ≈ b; Y ≈ a; Z ≈ c. *Dispersion:* r > v, weak. α = 1.498(1) β = n.d. γ = 1.502(1) 2V(meas.) = 70°–105°

**Cell Data:** *Space Group:* I2/a. a = 13.692(3) b = 13.643(3) c = 13.560(3) β = 90.5(1)° Z = 8

**X-ray Powder Pattern:** Wairakei, New Zealand.

3.39 (10), 5.57 (8), 3.42 (6), 2.909 (5), 6.85 (4), 4.84 (4), 2.680 (4)

| <b>Chemistry:</b>              | (1)  | (2)   | (3)   |                               | (1)    | (2)    | (3)    |
|--------------------------------|------|-------|-------|-------------------------------|--------|--------|--------|
| SiO <sub>2</sub>               | 55.9 | 54.46 | 55.33 | Na <sub>2</sub> O             | 1.06   | 0.26   |        |
| Al <sub>2</sub> O <sub>3</sub> | 23.0 | 23.92 | 23.47 | K <sub>2</sub> O              | 0.16   | 0.04   |        |
| Fe <sub>2</sub> O <sub>3</sub> |      | 0.04  |       | Cs <sub>2</sub> O             | 0.02   |        |        |
| MgO                            |      | trace |       | H <sub>2</sub> O <sup>+</sup> | 8.35   |        |        |
| CaO                            | 11.7 | 12.94 | 12.91 | H <sub>2</sub> O <sup>-</sup> | 0.15   |        |        |
| SrO                            | 0.05 |       |       | H <sub>2</sub> O              |        | 8.46   | 8.29   |
|                                |      |       |       | Total                         | 100.39 | 100.12 | 100.00 |

(1) Wairakei, New Zealand. (2) Seigoshi mine, Japan; by AA, gravimetry, and TGA.

(3) CaAl<sub>2</sub>Si<sub>4</sub>O<sub>12</sub>•2H<sub>2</sub>O.

**Mineral Group:** Zeolite group.

**Occurrence:** In pores and cavities in rocks in geothermal areas, deposited from hydrothermal fluids; may replace feldspar. In tuffaceous sandstones and breccias, vitric and welded tuffs, and in clay.

**Association:** Andesine, epidote, clinozoisite, prehnite, calcite, aragonite, quartz.

**Distribution:** Some of the known localities follow. In New Zealand, on North Island, at Wairakei, about six km north-northeast of Lake Taupo, and in the Tui mine, Te Aroha, Auckland. In the USA, from The Geysers, Sonoma Co., and near Rosamond, Kern Co., California; in Yellowstone National Park, Wyoming; and Mt. Rainier National Park, Pierce Co., Washington. On St. Thomas and St. Croix, American Virgin Islands. In the Buttle Lake area, Vancouver Island, British Columbia, Canada. In Japan, in the Seikoshi mine, Toi, and at Kawazu, Shizuoka Prefecture; from Koriyama, Fukushima Prefecture; Onikobe, Miyagi Prefecture; the Yugami district, Fukui Prefecture; Hikihara, Hyogo Prefecture, and at a number of other localities.

**Name:** For the first-noted locality at Wairakei, New Zealand.

**Type Material:** Geological Survey of New Zealand, Lower Hutt, New Zealand, P13871; National Museum of Natural History, Washington, D.C., USA, 137192.

**References:** (1) Steiner, A. (1955) Wairakite, the calcium analogue of analcime, a new zeolite mineral. *Mineral. Mag.*, 30, 691–708. (2) Coombs, D.S. (1955) X-ray observations on wairakite and non-cubic analcime. *Mineral. Mag.*, 30, 699–708. (3) (1956) *Amer. Mineral.*, 41, 166–167 (abs. refs. 1 and 2). (4) Takéuchi, Y., F. Mazzi, N. Haga, and E. Galli (1979) The crystal structure of wairakite. *Amer. Mineral.*, 64, 993–1001. (5) Aoki, M. and H. Minato (1980) Lattice constants of wairakite as a function of chemical composition. *Amer. Mineral.*, 65, 1212–1216.

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