Katoite $\mathbf{Ca_3Al_2(SiO_4)_{3-x}(OH)_{4x}}$ (x = 1.5 to 3.0)

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Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. Octahedra crystals, typically rounded, to 0.3 mm, in thin crusts of columnar aggregates.

Physical Properties: Hardness = n.d. D(meas.) = n.d. D(calc.) = 2.76

Optical Properties: Transparent to translucent. *Color:* Milky white; in transmitted light, colorless.
Optical Class: Isotropic; may be weakly birefringent. $n = 1.632(1)$

Cell Data: *Space Group: Ia3d.* a = 12.358(2) Z = 8

X-ray Powder Pattern: Campomorto quarry, Italy.
2.763 (100), 2.257 (58), 2.004 (58), 3.089 (50), 5.046 (37), 1.6507 (37), 3.303 (32)

Chemistry:

	(1)
SiO_2	10.58
Al_2O_3	24.01
MgO	0.07
CaO	42.27
H_2O	20.8
SO_3	2.27
Total	[100.00]

(1) Campomorto quarry, Italy; by electron microprobe, H_2O by TGA, recalculated slightly to 100.00%; corresponds to $Ca_{2.96}(Al_{1.85}Mg_{0.01})_{\Sigma=1.86}(Si_{0.69}S_{0.11})_{\Sigma=0.80}[(OH)_{9.07}O_{2.93}]_{\Sigma=12.00}$.

Polymorphism & Series: Forms a series with grossular and hibschite.

Mineral Group: Garnet group.

Occurrence: A hydrothermal mineral in cavities in a phonolitic lava flow that erupted through an argillaceous marl.

Association: Tobermorite, afwillite, gehlenite, hydrocalumite, "opal," portlandite, apophyllite, cordierite, jennite, strätlingite, chabazite, gismondine, phillipsite, vertumnite, ettringite, garnet, wollastonite, gypsum, calcite, quartz, hematite.

Distribution: In the Campomorto quarry, near Montalto di Castro, Lazio, Italy.

Name: In honor of Akira Kato, mineralogist of the National Science Museum, Tokyo, Japan.

Type Material: Municipal Museum of Natural History, Milan, Italy; National Museum of Natural History, Washington, D.C., USA, 163797.

References: (1) Passaglia, E. and R. Rinaldi (1984) Katoite, a new member of the $Ca_3Al_2(SiO_4)_3$ – $Ca_3Al_2(OH)_{12}$ series and a new nomenclature for the hydrogrossular group of minerals. Bull. Minéral., 107, 605–618. (2) (1985) Amer. Mineral., 70, 873 (abs. ref. 1).

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