Thomsonite-Ca $NaCa_2(Al_5Si_5)O_{20}\cdot 6H_2O$

Crystal Data: Orthorhombic, pseudotetragonal. *Point Group*: 2/*m* 2/*m* 2/*m*. Crystals commonly prismatic, acicular, or bladed, flattened on {010}, elongated and striated || [001], to 12 cm; in radiated spherical or columnar aggregates; smooth, globular, botryoidal; compact, massive. *Twinning*: On {110}.

Physical Properties: *Cleavage*: Perfect on {010}, good on {100}. *Fracture*: Uneven to subconchoidal. *Tenacity*: Brittle. Hardness = 5-5.5 D(meas.) = 2.23-2.39 D(calc.) = 2.366 Pyroelectric.

Optical Properties: Transparent to translucent. *Color*: White, yellowish, pink, brown, greenish, may be concentrically zoned; colorless in thin section. *Streak*: White. *Luster*: Vitreous to pearly. *Optical Class*: Biaxial (+). *Orientation*: $X = a$, $Y = c$, $Z = b$. *Dispersion*: $r > v$; strong. α = 1.497-1.530 β = 1.513-1.533 γ = 1.518-1.544 2V(meas.) = 42°-75°

Cell Data: *Space Group*: *Pncn* (*Pbmn* if disordered). a = 13.088(2) b = 13.052(2) c = 13.229(2) Z=4

X-ray Powder Pattern: Kaden [sic, Kadan (Kaaden)], Czech Republic. (ICDD 19-1344). 2.86 (100), 4.64 (90), 2.68 (80), 2.95 (70), 3.51 (65), 6.60 (60), 3.19 (45)

Chemistry:

	(1)	(2)
SiO_2	37.17	41.49
Al_2O_3	31.93	28.59
CaO	13.98	11.89
Na_2O	4.00	4.23
K_2O	trace	
H_2O	13.35	[13.80]
Total	100.43	[100.00]

(1) Old Kilpatrick, Scotland; corresponds to $Na_{1.04}Ca_{2.00}Al_{5.03}Si_{4.97}O_{20}\cdot 5.95H_2O$. (2) Goble, Oregon, USA; by electron microprobe, H_2O by difference; corresponds to $Na_{1.09}Ca_{1.70}Al_{4.48}Si_{5.52}O_{20}\cdot 6H_2O$.

Polymorphism & Series: Forms an isomorphous series with thomsonite-Sr.

Mineral Group: Zeolite group.

Occurrence: In amygdules and fractures in mafic igneous rocks, typically basalts; in some alkalic igneous rocks, contact metamorphic zones, and hypabyssal rocks. An authigenic cement in some sandstones.

Association: Zeolites, calcite, prehnite, datolite, quartz.

Distribution: A common zeolite with many localities known; a few for good crystals are from Old Kilpatrick, Dumbartonshire, and Bishopton, Renfrew, Scotland. At Mt. Monzoni, Val di Fassa, Trentino-Alto Adige, Italy. From Ostroh (Seeberg), Kadan (Kaaden), and Ústí nad Lábem (Aussig), Czech Republic. At Hammer-Unterwiesenthal, Saxony, Germany. From Nolsoy, Essuroy, and Streymoy, Faeroe Islands. In the USA, at Paterson, Passaic Co., New Jersey; on North and South Table Mountain, Jefferson Co., Colorado; in Oregon, at Springfield, Lane Co., Drain, Douglas Co., Goble, Columbia Co., Ritter Hot Springs, Grant Co., and elsewhere. At Flinders, Victoria, Australia.

Name: For Dr. Thomas *Thomson* (1773-1852), Scottish chemist and mineralogist of Glasgow, Scotland, who first analyzed the mineral. Suffix indicates the Ca-dominant member of the series.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 607-609. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 359-376. (3) Wise, W.S. and R.W. Tschernich (1978) Habits, crystal forms and composition of thomsonite. Can. Mineral., 16, 487-493. (4) Diego Gatta, G., V. Kahlenberg, R. Kaindl, N. Rotiroti, P. Cappelletti, and M. de' Gennaro (2010) Crystal structure and low-temperature behavior of "disordered" thomsonite. Am. Mineral., 95, 495-501.