Thermonatrite  \( \text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O} \)

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Crystal Data:  Orthorhombic.  Point Group:  \( \text{mm}2 \).  Very rare in acicular crystals; typically as powdery crusts and efflorescences.

Physical Properties:  Cleavage:  On \{100\}, difficult.  Tenacity:  Somewhat sectile.  Hardness = 1–1.5  \( \text{D}(\text{meas.}) = 2.255 \) (synthetic).  \( \text{D}(\text{calc.}) = 2.262 \).  Soluble in \( \text{H}_2\text{O} \), alkaline taste; dehydrates readily.

Optical Properties:  Transparent.  Color:  Colorless to white, gray, pale yellow; colorless in transmitted light.  Luster:  Vitreous.  Optical Class:  Biaxial (\( \text{\( \text{\textit{\textbullet}} \))} \)).  Orientation:  \( \text{X} = \text{b}; \text{Y} = \text{c}; \text{Z} = \text{a} \).  Dispersion:  \( r < v \), weak. \( \alpha = 1.420 \)  \( \beta = 1.506 \)  \( \gamma = 1.524 \)  \( 2\text{V}(\text{meas.}) = 48^\circ \)

Cell Data:  Space Group:  \( \text{P2}_1\text{bc} \) (synthetic).  \( a = 6.472(2) \)  \( b = 10.724(3) \)  \( c = 5.259(2) \)  \( Z = 4 \)

X-ray Powder Pattern:  Synthetic.  2.768 (100), 2.372 (60), 2.753 (55), 2.678 (55), 2.684 (50), 2.475 (30), 2.010 (25)

Chemistry:  (1) Identification depends on coincidence of X-ray powder pattern and optical properties with synthetic material.

Occurrence:  Typically on soils and deposited from saline lakes; uncommon in volcanic fumaroles; in hydrothermal veins related to carbonatites.

Association:  Trona, natron, halite.

Distribution:  In minor amounts in deserts worldwide.  On Vesuvius, Campania, Italy.  In Russia, from the Kola Peninsula, on Mts. Rasvumchur and Kukisvumchur, and in the Vuonnemiok River valley, Khibiny massif; at Mt. Alluaiv, Lovozero massif; and in the Kovdor massif.  From the Ilimaussaq intrusion, Greenland.  At Mont Saint-Hilaire, Quebec, Canada.  In the USA, crystallized from Borax Lake, Lake Co., and at Deep Spring Lake, Inyo Co., California; at Point of Rocks, east of Springer, Colfax Co., New Mexico.  In the Lake Bogoria basin, Rift Valley, Kenya.  Around Mt. Erebus, Victoria Land, Antarctica.

Name:  From the Greek for heat and natron, as the dehydration product from heating natron.