Natron $Na_2CO_3 \cdot 10H_2O$

Crystal Data: Monoclinic. *Point Group:* m. Granular to fine crystalline, as crusts, efflorescences, and coatings. *Twinning:* On {001}.

Physical Properties: *Cleavage:* Distinct on {001}; imperfect on {010}; in traces on {110}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 1–1.5 D(meas.) = 1.478 D(calc.) = 1.458 Soluble in H_2O, alkaline taste; dehydrates rapidly in air forming thermonatrite.

Optical Properties: Semitransparent. *Color:* Colorless to white, may be yellow or gray due to impurities; colorless in transmitted light. *Luster:* Vitreous.
Optical Class: Biaxial (–). *Orientation:* $X = b$; $Z \wedge c \simeq 41°$. *Dispersion:* $r > v$, perceptible, crossed. $\alpha = 1.405(3)$ $\beta = 1.425(3)$ $\gamma = 1.440(3)$ 2V(meas.) = Large.

Cell Data: *Space Group:* Cc (synthetic). $a = 12.83(2)$ $b = 9.026(9)$ $c = 13.44(5)$ $\beta = 123.0(5)°$ Z = 4

X-ray Powder Pattern: Synthetic. (ICDD 15-800).
3.04 (100), 3.02 (70), 2.894 (60), 5.37 (45), 3.94 (30), 3.45 (25), 4.50 (20)

Chemistry:

	(1)	(2)
SO_3	0.83	
CO_2	15.66	15.38
MgO	0.15	
CaO	0.18	
Na_2O	21.50	21.66
Cl	0.41	
H_2O	61.69	62.96
Total	100.42	100.00

(1) Hall, Austria. (2) $Na_2CO_3 \cdot 10H_2O$.

Occurrence: Formed on the margins around soda-rich lakes, or as a precipitate on lake bottoms during cold weather; as an efflorescence on lavas; rare in differentiated alkaline massifs.

Association: Thermonatrite, trona, mirabilite, gaylussite, gypsum, calcite.

Distribution: Many reported occurrences may be of thermonatrite, an easily-obtained alteration product. Confirmed occurrences include: from the Debrecen and Szeged districts, Hungary. In Austria, in the Salzburger Schacht, Untersberg; at Hall, Tirol, from Dürrnberg, near Hallein, and at Hallstatt. On Vesuvius, Campania, and Etna, Sicily, Italy. On Mt. Alluaiv, Lovozero massif, Kola Peninsula, Russia. In the USA, noted in the Mt. Pisgah lava tubes, Mohave Desert, San Bernardino Co., California, and in Colorado, formed around artesian wells in the San Luis Valley, Costilla Co. In Goodenough Lake, near Clinton, British Columbia, and at Mont Saint-Hilaire, Quebec, Canada. Around Lake Fellmongery, Robe, South Australia.

Name: From *nitrum*, a name from antiquity.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 230–231. (2) Hintze, C. (1916–1929) Handbuch der Mineralogie, Gruyter & Co., Berlin, I(3.1), 2778–2787 [soda], esp. 2786 (in German). (3) Taga, T. (1969) Crystal structure of $Na_2CO_3 \cdot 10H_2O$. Acta Cryst., 25, 2656–2658.