

Hanksite

$\text{KNa}_{22}(\text{SO}_4)_9(\text{CO}_3)_2\text{Cl}$

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Crystal Data: Hexagonal. *Point Group:* $6/m$. As short prismatic to tabular hexagonal crystals, to 20 cm, dominated by combinations of $\{10\bar{1}0\}$, $\{10\bar{1}2\}$, $\{10\bar{1}1\}$, and $\{0001\}$; $\{10\bar{1}0\}$ striated $\perp [0001]$.

Physical Properties: *Cleavage:* On $\{0001\}$, good. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 3–3.5 $D(\text{meas.}) = 2.562$ $D(\text{calc.}) = 2.585$ Soluble in H_2O , saline taste; fluoresces pale yellow under LW UV.

Optical Properties: Transparent to translucent. *Color:* Colorless to pale yellow, may be grayish green due to clay inclusions; colorless in transmitted light. *Streak:* White. *Luster:* Vitreous to dull.

Optical Class: Uniaxial (-). $\omega = 1.481$ $\epsilon = 1.461$

Cell Data: *Space Group:* $P6_3/m$. $a = 10.465(21)$ $c = 21.191(43)$ $Z = 2$

X-ray Powder Pattern: Searles Lake, California, USA.

3.812 (100), 3.531 (75), 2.787 (72), 3.425 (60), 2.618 (47), 2.930 (31), 1.907 (22)

| Chemistry: | (1) | (2) |
|-----------------------|-------|--------|
| SO_3 | 45.78 | 46.05 |
| CO_2 | 5.63 | 5.62 |
| Na_2O | 43.61 | 43.56 |
| K | 2.39 | 2.50 |
| Cl | 2.28 | 2.27 |
| insol. | 0.12 | |
| Total | 99.81 | 100.00 |

(1) Searles Lake, California, USA. (2) $\text{KNa}_{22}(\text{SO}_4)_9(\text{CO}_3)_2\text{Cl}$.

Occurrence: In lacustrine evaporite deposits.

Association: Halite, borax, trona, apthitalite (Searles Lake, California, USA).

Distribution: In the USA, in California, large crystals from Searles Lake, San Bernardino Co.; at Soda Lake, San Luis Obispo Co.; from Mono Lake, Mono Co.; and in Death Valley, Inyo Co.

Name: Honors Henry Garber Hanks (1826–1907), for his service as first State Mineralogist of California, USA.

Type Material: Natural History Museum, Paris, France, 87.281; Natural History Museum, Vienna, Austria, E4854/8; National Museum of Natural History, Washington, D.C., USA, 81217.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 628–629. (2) Araki, T. and T. Zoltai (1973) The crystal structure of hanksite. Amer. Mineral., 58, 799–801.