Tunellite $SrB_6O_9(OH)_2 \cdot 3H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As crystals, to 10 cm, elongated along [001], or flattened on {100}, showing {100}, {001}, {110}, {011}, {111}; as compact fine-grained nodules.

Physical Properties: *Cleavage:* On {100}, perfect; on {001}, distinct. *Tenacity:* Flexible, inelastic, sectile. Hardness = 2.5 D(meas.) = 2.40(1) D(calc.) = 2.391

Optical Properties: Transparent. *Color:* Colorless to grayish white. *Luster:* Subvitreous, pearly on {100} faces and cleavages.
Optical Class: Biaxial (+). *Orientation:* $Y = b$; $X \wedge a = 29°$; $Z \wedge c = -5°$. *Dispersion:* $r > v$, weak. $\alpha = 1.519(3)$ $\beta = 1.534(2)$ $\gamma = 1.569(2)$ 2V(meas.) = n.d. 2V(calc.) = 68°

Cell Data: *Space Group:* $P2_1/a$. $a = 14.415(3)$ $b = 8.213(1)$ $c = 9.951(2)$ $\beta = 114.05(1)°$ Z = 4

X-ray Powder Pattern: Furnace Creek district, California, USA.
6.57 (100), 4.525 (11), 3.867 (9), 5.138 (8), 3.592 (8), 2.503 (8), 6.78 (7)

Chemistry:

	(1)	(2)
B_2O_3	53.70	54.31
SrO	27.71	26.95
H_2O	18.71	18.74
Total	100.12	100.00

(1) Boron, California, USA; H_2O by loss on ignition. (2) $SrB_6O_9(OH)_2 \cdot 3H_2O$.

Occurrence: A rare secondary mineral formed in borate deposits.

Association: Inderite, kurnakovite, ulexite, hydroboracite, colemanite, realgar, stibnite, celestine, analcime.

Distribution: In the USA, in California, from the Kramer borate deposit, Boron, Kern Co.; at the Thompson mine, near Ryan, Furnace Creek district, Death Valley, and in the east Kramer district, Inyo Co. In Turkey, from the Günevi and Kireçlik deposits, Bigadiç borate district, Balıkesir Province; in the Killik and Espey borate mines, near Emet, and at Sarıkaya, near Kirka, Kütahya Province.

Name: To honor Dr. George Gerard Tunell, Jr. (1900–1996), Professor of Geology, University of California, Los Angeles, California, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 123928.

References: (1) Erd, R.C., V. Morgan, and J.R. Clark (1961) Tunellite, a new hydrous strontium borate from the Kramer borate district, California. U.S. Geol. Surv. Prof. Paper 424-C, 294–297. (2) (1962) Amer. Mineral., 47, 416 (abs. ref. 1). (3) Burns, P.C. and F.C. Hawthorne (1994) Hydrogen bonding in tunellite. Can. Mineral., 32, 895–902.