Burkeite $Na_6(SO_4)_2(CO_3)$

Crystal Data: Orthorhombic. *Point Group:* $mm2$ or 222. Crystals are tabular {100}, with {010}, {110}, {001}, rough and uneven, to 4 mm; as reticulated aggregates, mulberrylike nodules, commonly massive. *Twinning:* On {110}, common, forming X-shapes.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 3.5
D(meas.) = 2.57 D(calc.) = 2.61 Soluble in H_2O.

Optical Properties: Transparent. *Color:* White, pale buff, grayish; colorless in transmitted light. *Luster:* Vitreous to greasy.
Optical Class: Biaxial (–). *Orientation:* $X = c$; $Y = a$; $Z = b$. *Dispersion:* $r > v$, distinct.
$\alpha = 1.448$ $\beta = 1.489$ $\gamma = 1.493$ 2V(meas.) = 34°

Cell Data: *Space Group:* $Pmnm$ (supercell). $a = 7.06$–7.09 $b = 9.21$–9.25 $c = 5.17$–5.19
Z = 2

X-ray Powder Pattern: Synthetic.
2.801 (100), 3.526 (80), 3.795 (75), 2.640 (75), 2.583 (75), 2.777 (55), 3.854 (40)

Chemistry:

	(1)	(2)
SO_3	39.96	41.05
CO_2	11.72	11.28
Na_2O	47.89	47.67
Cl	0.09	
H_2O	0.04	
insol.	0.04	
$-O = Cl_2$	[0.02]	
Total	[99.72]	100.00

(1) Searles Lake, California, USA. (2) $Na_6(SO_4)_2(CO_3) = Na_4(SO_4)[(SO_4)_{1-t}(CO_3)_t]$, t=2/3.

Occurrence: An uncommon product of evaporation in dry lakes, but typical of efflorescences on saline soils.

Association: Gaylussite, trona, sulfohalite, borax, northupite, thénardite, calcite, tychite, halite, hanksite (Searles Lake, California, USA).

Distribution: In the USA, in California, from Searles Lake, San Bernardino Co. and Deep Spring Lake, Inyo Co.; at Carbonate Lake, Grant Co., Washington; from Teels Marsh, Esmeralda Co., Nevada; in the Green River Formation, northern Piceance Creek Basin, and at Hortense and Mount Princeton Hot Springs, along Chalk Creek, Chaffee Co., Colorado. At Lake Katwe, western Uganda. From near Loiengalani, Lake Turkana, Kenya. Found near Ak Göl, Great Konya Basin, Konya Province, Turkey. In the Flumen-Monegros district, Huesca Province, Spain. From the McMurdo region and around Mt. Erebus, Victoria Land, Antarctica.

Name: Honors William Edmund Burke (1880–1966), chemical engineer, who first prepared the synthetic compound.

Type Material: National Museum of Natural History, Washington, D.C., USA, 97277, 102866–102872.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 633–634. (2) Giuseppetti, G., F. Mazzi, and C. Tadini (1988) The crystal structure of synthetic burkeite: $Na_4SO_4(CO_3)_t(SO_4)_{1-t}$. Neues Jahrb. Mineral., Monatsh., 203–221. (3) (1974) NBS Mono., 25, 11, 52.