Walstromite $BaCa_2Si_3O_9$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. Crystals nearly equant to short prismatic; grains anhedral to subhedral, to 1.5 cm.

Physical Properties: *Cleavage*: Perfect on {011}, {010}, and {100}. Hardness = ~3.5
D(meas.) = 3.67(6) D(calc.) = 3.738 Fluoresces dull pink under SW UV; bright pink under LW UV.

Optical Properties: Transparent to translucent. *Color*: White to colorless; colorless in thin section.
Streak: White. *Luster*: Subvitreous, pearly on cleavages.
Optical Class: Biaxial (-). $\alpha = 1.668(2)$ $\beta = 1.684(2)$ $\gamma = 1.685(2)$ 2V(meas.) = 30° 2V(calc.) = 28°
Dispersion: Weak.

Cell Data: *Space Group*: $P\bar{1}$. $a = 6.7335(2)$ $b = 9.6142(3)$ $c = 6.6859(2)$ $\alpha = 69.638(2)°$ $\beta = 102.281(2)°$ $\gamma = 96.855(2)°$ Z = 2

X-ray Powder Pattern: Fresno Co., California, USA.
2.99 (100), 6.58 (20), 2.70 (20), 4.40 (15), 3.35 (15), 3.20 (15), 3.06 (15)

Chemistry:

	(1)	(2)	(3)	(4)
SiO_2	39.6	38.8	40.56	40.44
TiO_2	< 0.01	0.03	0.16	
Al_2O_3	0.07		0.15	
FeO	< 0.02	< 0.01		
MnO	0.33	0.18		
MgO	< 0.05	< 0.1		
CaO	26.1	26.2	25.60	25.16
SrO	0.53		0.27	
BaO	33.3	34.5	33.62	34.40
K_2O	< 0.05	< 0.05	0.03	
Na_2O			0.06	
Total	[100.00]	[100.00]	100.45	100.00

(1-2) Fresno Co., California, USA; by D-C arc spectrography, stated to be recalculated to 100.00%. (3) Gurim Anticline, Negev Desert, Israel; electron microprobe analysis; corresponds to $(Ba_{0.97}Sr_{0.01}Ca_{0.02})_{\Sigma=1.00}(Ca_{2.00}Na_{0.01})_{\Sigma=2.01}(Si_{2.98}Al_{0.01}Ti_{0.01})_{\Sigma=3.00}O_9$. (4) $BaCa_2Si_3O_9$.

Occurrence: Disseminated in a sanbornite-quartz gneissic metamorphic rock, especially where the quartz content is high. In small veins of pyrometamorphic rankinite paralava within gehlenite hornfelses (Israel).

Association: Sanbornite, quartz, wollastonite, celsian, taramellite, pyrrhotite, pyrite, witherite, fresnoite. Zadovite, gurimite, rankinite, gehlenite, garnet (Israel).

Distribution: From the Rush Creek and Big Creek areas, Fresno Co., and on Trumbull Peak, near Incline, Mariposa Co., California, USA. From Gurim Anticline and Zuk Tamrur, Negev Desert, Israel. At El Rosario and La Madrelena claim, Baja California Norte, Mexico.

Name: For Robert E. *Walstrom*, mineral collector of Fresno, California, USA, who first recognized the distinctive character of the mineral.

Type Material: California Division of Mines & Geology, San Francisco, California, USA.

References: (1) Alfors, J.T., M.C. Stinson, R.A. Matthews, and A. Pabst (1965) Seven new barium minerals from eastern Fresno Co., California. Amer. Mineral., 50, 314-340. (2) Glasser, L.S.D. and F.P. Glasser (1968) The crystal structure of walstromite. Amer. Mineral., 53, 9-13. (3) Barkley, M.C., R.T. Downs, and H. Yang (2011) Structure of walstromite, $BaCa_2Si_3O_9$, and its relationship to $CaSiO_3$-walstromite and wollastonite-II . Amer. Mineral., 96, 797-801. (4) Krzątała, A., B. Krüger, I. Galuskina, Y. Vapnik, and E. Galuskin (2020) Walstromite, $BaCa_2(Si_3O_9)$, from Rankinite Paralava within Gehlenite Hornfels of the Hatrurim Basin, Negev Desert, Israel. Minerals, 10(5), 407.