Bernarlottiite $Pb_{12}(As_{10}Sb_6)S_{36}$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As crystals, acicular on [010], to 1 mm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 5.601

Optical Properties: Opaque. *Color*: Lead-gray; white in reflected light with red internal reflections. *Streak*: Black. *Luster*: Metallic. *Anisotropism*: Distinct to strong in grayish to bluish tints. *Bireflectance:* Distinct. *Pleochrism*: Weak, shades of gray-blue.
Optical Class: n.d.
R_1-R_2: (400) 30.3 –, (420) 29.4-39.6, (440) 29.9-38.3, (460) 29.8-38.1, (470) 30.0-37.5, (480) 29.9-37.6, (500) 29.9-37.2, (520) 30.2-37.4, (540) 30.4-37.5, (546) 30.3-37.3, (560) 30.1-37.1, (580) 29.9-36.9, (589) 29.7-36.8, (600) 29.8-36.7, (620) 29.2-35.9, (640) 29.5-36.4, (650) 29.3-36.2, (660) 28.8-35.5, (680) 28.4-36.9, (700) 28.4-36.9

Cell Data: *Space Group*: $P\bar{1}$. a = 23.704(8) b = 8.386(2) c = 23.501(8) α = 89.91(1)° β = 102.93(1)° γ = 89.88(1)° Z = 3

X-ray Powder Pattern: Ceragiola quarry, Seravezza, Apuan Alps, Tuscany, Italy.
2.748 (vs), 2.221 (vs), 3.851 (s), 3.794 (s), 3.278 (s), 3.075 (s), 2.363 (s)

Chemistry:

	(1)	(2)
Cu	0.09	
Pb	48.89	47.43
As	17.48	14.56
Sb	11.36	13.92
S	23.11	22.64
Total	100.93	98.55

(1) Ceragiola quarry, Seravezza, Apuan Alps, Tuscany, Italy; average of 3 electron microprobe analyses of grain #2987; corresponds to $Pb_{11.71(18)}Cu_{0.07(12)}As_{11.59(21)}Sb_{4.63(9)}S_{35.78(48)}$.
(2) Ceragiola quarry, Seravezza, Apuan Alps, Tuscany, Italy; average of 5 electron microprobe analyses of grain #3819; corresponds to $Pb_{11.92(6)}As_{10.12(14)}Sb_{5.95(8)}S_{36.76(32)}$.

Polymorphism & Series: N = 3.5 homeotype of the sartorite homologous series.

Occurrence: Of hydrothermal origin in cavities, to 30 cm, in marble related to tectonometamorphism.

Association: Sb-rich sartorite.

Distribution: At the Ceragiola quarry, Seravezza, Apuan Alps, Tuscany, Italy.

Name: Honors Bernardino Lotti (1847-1933) for his significant contributions to the knowledge of the geology of Tuscany and to the development of the Tuscan mining industry.

Type Material: Natural History Museum, University of Pisa, Italy (19687).

References: (1) Orlandi, P., C. Biagioni, E. Bonaccorsi, Y. Moëlo, and W.H. Paar (2017) Lead-antimony sulfosalts from Tuscany (Italy). XXI. Bernarlottiite, $Pb_{12}(As_{10}Sb_6)_{\Sigma 16}S_{36}$, a new N = 3.5 member of the sartorite homologous series from the Ceragiola marble quarry: occurrence and crystal structure. Eur. J. Mineral., 29(4), 713-726. (2) (2018) Amer. Mineral., 103, 828 (abs. ref. 1).