Northstarite $Pb_6(Te^{4+}O_3)_5(S^{6+}O_3S^{2-})$

Crystal Data: Hexagonal. *Point Group*: 6. As rough-faced, prismatic crystals with pyramidal terminations, to ~1 mm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = 2 D(meas.) = n.d. D(calc.) = 6.977 Nonfluorescent.

Optical Properties: Transparent to translucent. *Color*: Beige. *Streak*: White. *Luster*: Adamantine. *Optical Class*: Uniaxial (-). *n*(calc.) = 2.15 Non-pleochroic.

Cell Data: *Space Group*: $P6_3$. a = 10.253(1) c = 11.6747(8) Z = 2

X-ray Powder Pattern: North Star mine, Mammoth, Tintic district, Juab Co., Utah, USA.
3.098 (100), 2.957 (74), 2.140 (44), 1.733 (41), 1.626 (31), 5.12 (21), 1.706 (18)

Chemistry:

	(1)	(2)
PbO	57.16	59.96
Sb_2O_3	0.32	
TeO_2	35.46	35.73
SO_3	[3.61]	3.58
S	[1.44]	1.44
-O = S	0.72	0.72
Total	97.27	100.00

(1) North Star mine, Mammoth, Tintic district, Juab Co., Utah, USA; average electron microprobe and Raman spectroscopic analyses, SO_3 and S^{2-} calculated from measured SO_3 = 7.22 according to S^{6+}:S^{2-} = 1:1; corresponds to $Pb_{5.80}Sb^{3+}_{0.05}Te^{4+}_{5.04}S^{6+}_{1.02}S^{2-}_{1.02}O_{18}$. (2) $Pb_6(Te^{4+}O_3)_5(S^{6+}O_3S^{2-})$.

Occurrence: An oxidation-zone mineral in a vug in massive quartz-baryte-enargite-pyrite in a polymetallic (Au-Ag-Cu-Pb) vein deposit emplaced in contact-metamorphosed dolomite.

Association: Anglesite, azurite, chrysocolla, fluorapatite, plumbogummite, tellurite, zincospiroffite, adanite.

Distribution: From the North Star mine, Mammoth, Tintic district, Juab Co., Utah, USA.

Name: For the mine that contained the studied material.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (67291).

References: (1) Kampf, A.R., R.M. Housley, and G.R. Rossman (2020) Northstarite, a new lead-tellurite-thiosulfate mineral from the North Star mine, Tintic, Utah, USA. Can. Mineral., 58, 533-542.