Torreyite $(Mg, Mn^{2+})_9Zn_4(SO_4)_2(OH)_{22}\cdot 8H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Rare blocky crystals, to 1 mm, in parallel growth; foliated, fine-grained granular to massive. *Twinning:* Ubiquitous microscopic polysynthetic twinning on a twin plane in [010].

Physical Properties: *Cleavage:* {010}, good. *Tenacity:* Somewhat brittle. Hardness = 3
D(meas.) = 2.665 D(calc.) = 2.65

Optical Properties: Translucent. *Color:* Bluish white to colorless; colorless in transmitted light. *Luster:* Vitreous to almost pearly, dull.
Optical Class: Biaxial (–). *Orientation:* $X = b$. $\alpha = 1.570$ $\beta = 1.584$ $\gamma = 1.585$
2V(meas.) = ∼40°

Cell Data: *Space Group:* $P2_1/a$. $a = 10.522$ $b = 9.433$ $c = 16.443$ $\beta = 94.91°$ Z = 2

X-ray Powder Pattern: Sterling Hill, New Jersey, USA.
10.2 (100), 5.16 (50), 1.566 (50), 3.84 (40), 2.729 (40), 6.10 (30), 4.52 (20)

Chemistry:

	(1)
SO_3	11.64
SiO_2	0.08
MnO	17.98
ZnO	26.30
MgO	17.27
H_2O	26.39
Total	99.66

(1) Sterling Hill, New Jersey, USA; deducting SiO_2, corresponds to $(Mg_{5.60}Mn_{3.31})_{\Sigma=8.91}$ $Zn_{4.22}(SO_4)_{1.90}(OH)_{22.46}\cdot 7.928H_2O$.

Occurrence: Very rare, in veinlets cutting calcite–franklinite–willemite ore in a metamorphosed stratiform zinc orebody.

Association: Mooreite, fluoborite, pyrochroite, sussexite, rhodochrosite, zincite, franklinite, willemite, calcite.

Distribution: At Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA.

Name: Honors Dr. John Torrey (1796–1873), American naturalist who early studied Franklin, New Jersey, USA minerals.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 113732.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 575–576. (2) Dunn, P., D.R. Peacor, and B.D. Sturman (1979) Lawsonbauerite, a new mineral from the Sterling Hill mine, New Jersey, and new data for torreyite. Amer. Mineral., 64, 949–952. (3) Treiman, A.H. and D.R. Peacor (1982) The crystal structure of lawsonbauerite, $(Mn, Mg)_9Zn_4(SO_4)_2(OH)_{22}\cdot 8H_2O$, and its relation to mooreite. Amer. Mineral., 67, 1029–1034. (4) Dunn, P.J. (1995) Franklin and Sterling Hill, New Jersey. No publisher, n.p., 639–640.