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

Crystal Data: Monoclinic. *Point Group:* $2/m$. As bladed prismatic crystals, elongated along [010], flattened on {001}, showing {001}, {100}, to 0.5 mm, typically in parallel growths.

Physical Properties: *Fracture:* Even. *Tenacity:* Moderately brittle. Hardness = ∼4.5
D(meas.) = 2.87(4) D(calc.) = 2.92

Optical Properties: Semitransparent. *Color:* Colorless to white, coated by black manganese oxides. *Luster:* Dull to vitreous.
Optical Class: Biaxial (–). *Orientation:* $Y = b$; $Z \wedge c = 7°$. *Dispersion:* $r > v$, strong.
$\alpha = 1.590(2)$ $\beta = 1.608(2)$ $\gamma = 1.611(2)$ 2V(meas.) = 42(1)° 2V(calc.) = 45°

Cell Data: *Space Group:* $P2_1/c$. $a = 10.50(5)$ $b = 9.64(5)$ $c = 16.41(8)$ $\beta = 95.21(10)°$
Z = 2

X-ray Powder Pattern: Sterling Hill, New Jersey, USA.
10.5 (100), 5.24 (60), 3.90 (50), 1.587 (50), 2.772 (40), 6.24 (30), 3.33 (30)

Chemistry:

	(1)
SO_3	10.8
FeO	0.1
MnO	32.6
ZnO	23.1
MgO	8.4
H_2O	[25.0]
Total	[100.0]

(1) Sterling Hill, New Jersey, USA; by electron microprobe, total Fe as FeO, total Mn as MnO, H_2O by difference; corresponds to $(Mn_{6.81}Mg_{3.09}Fe_{0.02})_{\Sigma=9.92}Zn_{4.21}(SO_4)_{2.00}(OH)_{24.26}\cdot 8.44H_2O$; later crystal-structure analysis established the formula as $(Mn,Mg)_9Zn_4(SO_4)_2(OH)_{22}\cdot 8H_2O$.

Occurrence: A rare secondary mineral formed in a metamorphosed stratiform zinc orebody.

Association: Sussexite, pyrochroite, zincite, franklinite, calcite.

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

Name: Honors Lawson H. Bauer (1889–1954), American chemist, New Jersey Zinc Company, Franklin, New Jersey, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 143003.

References: (1) Dunn, P.J., D.R. Peacor, and B.D. Sturman (1979) Lawsonbauerite, a new mineral from Sterling Hill mine, New Jersey, and new data for torreyite, Amer. Mineral., 64, 949–952. (2) 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.