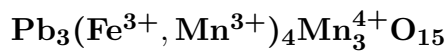


Zenzénite

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Crystal Data: Hexagonal. *Point Group:* 6/m 2/m 2/m. As euhedral to subhedral grains, to 150 μm , tabular on {0001}.

Physical Properties: *Cleavage:* {0001}, distinct. Hardness = 5.7 VHN = 739–795, 764 average (50 g load). D(meas.) = n.d. D(calc.) = 6.83 Weakly magnetic.

Optical Properties: Opaque. *Color:* Black; bright white in reflected light.
Optical Class: Uniaxial. *Anisotropism:* Distinct; in shades of gray and pale brown.
Birefractance: Weak; visible only in oil.

R₁–R₂: (400) 32.0–25.9, (420) 31.7–26.2, (440) 31.6–26.5, (460) 31.2–26.2, (480) 30.8–25.9, (500) 30.4–25.6, (520) 30.0–25.4, (540) 29.6–25.1, (560) 29.2–24.8, (580) 28.7–24.5, (600) 28.3–24.2, (620) 27.8–23.9, (640) 27.4–23.6, (660) 27.1–23.3, (680) 26.8–22.9, (700) 26.5–22.6

Cell Data: *Space Group:* P6₃/mcm. a = 10.008(4) c = 13.672(8) Z = 4

X-ray Powder Pattern: Långban, Sweden.
2.663 (10), 3.18 (8), 1.687 (8), 2.828 (7), 2.366 (6), 3.42 (5), 2.104 (4)

Chemistry:

	(1)
SiO ₂	0.03
TiO ₂	0.19
MnO ₂	23.63
Al ₂ O ₃	0.19
Fe ₂ O ₃	15.36
Mn ₂ O ₃	8.88
ZnO	0.00
PbO	53.68
MgO	0.12
BaO	0.06
Total	[102.14]

(1) Långban, Sweden; by electron microprobe, Mn³⁺:Mn⁴⁺ and Fe³⁺ from crystal-structure analysis, original total given as 102.15%; corresponding to Pb_{2.87}Ba_{0.01}(Fe_{2.30}³⁺Mn_{1.35}³⁺Mg_{0.04}Al_{0.04})_{Σ=3.73}(Mn_{3.24}⁴⁺Ti_{0.03}Si_{0.01})_{Σ=3.28}O₁₅.

Occurrence: In a carbonate-phyllsilicate skarn rock, in a metamorphosed Fe–Mn orebody.

Association: Dolomite, hausmannite, jacobsonite, calcite, barytocalcite, norsethite, manganoan chlorite, kinoshitalite, pinakiolite, macedonite.

Distribution: From Långban, Värmland, Sweden.

Name: For Dr. Nils Zenzén (1883–1959), formerly Senior Curator of the Swedish Museum of Natural History, Stockholm, Sweden.

Type Material: Swedish Museum of Natural History, Stockholm, Sweden, 401841.

References: (1) Holtstam, D., B. Lindqvist, M. Johnsson, and R. Norrestam (1991) Zenzénite: Pb₃(Fe³⁺, Mn³⁺)₄Mn₃⁴⁺O₁₅, a new mineral species from Långban, Filipstad, Sweden, and its crystal structure. *Can. Mineral.*, 29, 347–354. (2) (1991) *Amer. Mineral.*, 76, 2024–2025 (abs. ref. 1).