

Joessmithite**PbCa₂(Mg, Fe³⁺, Fe²⁺)₅(Si₆Be₂)O₂₂(OH)₂**

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Crystal Data: Monoclinic. *Point Group:* 2/m. As prismatic, crudely doubly terminated, highly-modified crystals, elongated along [001] and flattened on {100}, up to 1 cm. Principal forms are {110}, {100}, {010}, {011}, {112}, and {113}.

Physical Properties: *Cleavage:* Perfect on {110}. *Hardness* = 5.5 *D*(meas.) = 3.83(1) *D*(calc.) = 3.91

Optical Properties: Opaque to transparent in thin fragments. *Color:* Black; olive-brown in thin fragments. *Streak:* Pale brown. *Luster:* Subadamantine.

Optical Class: Biaxial (+). *Pleochroism:* X = Z = olive; Y = brown with olive tint.

Absorption: Y > X = Z. $\alpha = 1.747(5)$ $\beta = 1.765(5)$ $\gamma = 1.78(1)$ $2V(\text{meas.}) = 60^\circ\text{--}70^\circ$

Cell Data: *Space Group:* P2/a. *a* = 9.915(2) *b* = 17.951(4) *c* = 5.243(1) $\beta = 105.95(2)^\circ$ *Z* = 2

X-ray Powder Pattern: Långban, Sweden.

3.33 (10), 2.564 (6), 2.530 (6), 2.740 (5.5), 3.70 (5), 2.903 (5), 2.676 (5)

Chemistry:

	(1)		(1)
SiO ₂	35.4	CaO	9.9
Al ₂ O ₃	0.5	BaO	0.3
Fe ₂ O ₃	12.3	Na ₂ O	0.5
FeO	2.6	K ₂ O	0.0
MnO	2.3	H ₂ O ⁺	[1.5]
PbO	20.7	F	0.3
BeO	[4.2]	–O = F ₂	0.1
MgO	9.6	Total	[100.0]

(1) Långban, Sweden; by electron microprobe, average of four analyses, presence of Be confirmed by ion microprobe; Fe²⁺:Fe³⁺ calculated from charge balance, BeO from stoichiometry, H₂O by difference; corresponds to (Pb_{0.98}Ba_{0.02}) $\Sigma=1.00$ (Ca_{1.86}Na_{0.16}) $\Sigma=2.02$ (Mg_{2.52}Fe_{1.63}³⁺Fe_{0.38}²⁺Mn_{0.34}Al_{0.10}) $\Sigma=4.97$ (Si_{6.22}Be_{1.78}) $\Sigma=8.00$ O₂₂[(OH)_{1.81}F_{0.19}] $\Sigma=2.00$.

Mineral Group: Amphibole (calcic) group: (Na + K)_A < 0.5; Na_B < 0.67; (Ca + Na)_B ≥ 1.34.

Occurrence: A rare mineral in a metamorphosed Fe–Mn orebody.

Association: Hematite, magnetite, manganoan aegirine, quartz, barite, calcite.

Distribution: At Långban, Värmland, Sweden.

Name: For Professor Joseph Victor Smith (1928–), English-American mineralogist and petrologist of the University of Chicago, Chicago, Illinois, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 120064, 162612.

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