

Schuilingite-(Nd)**PbCu(Nd, Gd, Sm, Y, Dy)(CO₃)₃(OH)•H₂O**

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Crystal Data: Orthorhombic. *Point Group:* $mm2$. Crystals are acicular, to 1.5 mm, with large {110}, minor {010}, terminated by {0k}, isolated, in subparallel aggregates, or in crusts.

Physical Properties: *Cleavage:* Perfect on {110}; poor on {100}. *Hardness* = 3.5
D(meas.) = n.d. D(calc.) = 4.74

Optical Properties: Transparent. *Color:* Azure-blue, deep blue. *Luster:* Adamantine.
Optical Class: Biaxial (-). *Pleochroism:* Weak; X = colorless to pale blue; Y = azure-blue; Z = blue. *Orientation:* $X = a$; $Y = c$; $Z = b$. $\alpha = 1.730$ $\beta = 1.770$ $\gamma = 1.795$
 $2V(\text{meas.}) = \sim 60^\circ\text{--}75^\circ$ $2V(\text{calc.}) = 56^\circ\text{--}63^\circ$

Cell Data: *Space Group:* $P2_1cn$. $a = 7.419(2)$ $b = 18.859(3)$ $c = 6.395(1)$ $Z = 4$

X-ray Powder Pattern: [Kasompi mine,] Congo.
3.827 (100), 2.928 (100), 4.46 (90), 3.162 (90), 4.77 (80), 4.67 (80), 2.634 (80)

Chemistry:	(1)	(2)		(1)	(2)
CO ₂	20.74	[20.54]	Dy ₂ O ₃	3.05	3.74
Y ₂ O ₃	2.04	2.90	Er ₂ O ₃		0.89
La ₂ O ₃	1.00	0.94	Yb ₂ O ₃	trace	0.30
Pr ₂ O ₃	1.14	0.80	Lu ₂ O ₃	trace	
Nd ₂ O ₃	8.51	6.31	CuO	11.89	11.35
Sm ₂ O ₃	3.44	3.16	PbO	36.03	36.85
Eu ₂ O ₃	2.44	1.63	H ₂ O	5.10	[4.20]
Gd ₂ O ₃	3.95	5.12	Total	99.33	[99.39]
Tb ₂ O ₃	trace	0.66			

(1) [Kasompi mine,] Congo; by electron microprobe, CO₂ by chromatography, CO₂+H₂O by TGA; corresponds to Pb_{1.04}Cu_{0.96}(Nd_{0.32}Gd_{0.14}Sm_{0.13}Y_{0.12}Dy_{0.11}Eu_{0.09}La_{0.04}Pr_{0.04}) $\Sigma=0.99$ (CO₃)_{3.01}(OH)_{0.95}•0.85H₂O. (2) Do.; by electron microprobe, average of five analyses, CO₂ and H₂O calculated for stoichiometry, original total given as 98.91%; corresponds to Pb_{1.05}Cu_{0.92}(Nd_{0.24}Gd_{0.18}Y_{0.16}Dy_{0.13}Sm_{0.12}Eu_{0.06}La_{0.04}Pr_{0.03}Er_{0.03}Tb_{0.02}Yb_{0.01}) $\Sigma=1.02$ (CO₃)₃(OH)•H₂O.

Occurrence: A rare secondary mineral in the oxidized zone of hydrothermal base metal deposits.

Association: Gysinite-(Nd), malachite, cerussite, wulfenite, kasolite, schoepite, uranophane, curite, françoisite-(Nd), kamotoite-(Y), astrocyanite-(Ce), masuyite, uraninite.

Distribution: From the Kasompi, Menda, and Kamoto East mines, Katanga Province, Congo (Shaba Province, Zaire).

Name: To honor Hendrik Jan Schuiling (1892–1966), Chief Geologist, Union Minière du Haut-Katanga, Congo.

Type Material: Royal Museum of Central Africa, Tervuren, Belgium, RMG11.418.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 252. (2) Piret, P. and M. Deliens (1982) Nouvelles données sur la schuilingite, carbonate hydraté de terres rares, de plomb et de cuivre. Bull. Minéral., 105, 225–228 (in French with English abs.). (3) Sarp, H., J. Bertrand, and J. Deferne (1983) Données nouvelles sur la schuilingite de Shinkolobwe (Shaba, Zaïre), carbonate hydraté de plomb, cuivre et de terres rares. Schweiz. Mineral. Petrog. Mitt., 63, 1–6 (in French with English abs.). (4) Schindler, M. and F.C. Hawthorne (1999) The crystal structure of schuilingite-(Nd). Can. Mineral., 37, 1463–1470.