Sengierite $Cu_2(UO_2)_2(V_2O_8)(OH)_2 \cdot 6H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals are six-sided thin plates, flattened on {001}, to 2 mm, showing {001}, {110}, {100}, {201}, {111}; as flaky coatings.

Physical Properties: *Cleavage:* On {001}, perfect. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 4.05 D(calc.) = 4.10 Radioactive.

Optical Properties: Transparent. *Color:* Yellowish green to greenish yellow. *Streak:* Pale green. *Luster:* Vitreous to adamantine.
Optical Class: Biaxial (–). *Pleochroism:* X = bluish green to colorless; Y = olive-green to greenish yellow; Z = yellowish green to colorless. *Orientation:* $Y = b$; $X \wedge c = 13°40'$. *Dispersion:* $r < v$, strong. *Absorption:* $Z = Y > X$. α = 1.76–1.77 β = 1.92–1.94 γ = 1.94–1.97 2V(meas.) = 37°–39°

Cell Data: *Space Group:* $P2_1/a$. $a = 10.599(5)$ $b = 8.093(4)$ $c = 10.085(9)$ $\beta = 103.42(6)°$ Z = 2

X-ray Powder Pattern: Luiswishi mine, Congo.
9.82 (vvs), 4.91 (vs), 3.735 (s), 3.197 (s), 3.179 (s), 3.144 (s), 3.094 (s)

Chemistry:

	(1)	(2)
UO_3	47.45	55.05
V_2O_5	15.96	17.50
$(Fe,Al)_2O_3$	1.43	
CuO	14.82	15.31
H_2O	15.77	12.14
Total	95.43	100.00

(1) Luiswishi mine, Congo. (2) $Cu_2(UO_2)_2(V_2O_8)(OH)_2 \cdot 6H_2O$.

Occurrence: A rare secondary mineral, deposited from solutions derived from primary uraninite.

Association: Volborthite, vandenbrandeite, malachite, chrysocolla, cobalt oxides (Luiswishi mine, Congo); chalcocite, covellite, malachite, tyuyamunite, chlorargyrite (Cole shaft, Arizona, USA).

Distribution: From the Luiswishi copper mine, Lubumbashi; at Shinkolobwe and in the Ruiwe, Musonoi, and Mutoshi mines, Katanga Province, Congo (Shaba Province, Zaire). From the Cole shaft, Bisbee, Cochise Co., Arizona, and the Section 33 mine, Grants district, McKinley Co., New Mexico, USA. In the Malargüe district, Mendoza Province, Argentina. At the Rabéjac uranium deposit, seven km south-southeast of Lodève, Hérault, France. From the Argana Bigoudine area, Amelal, Morocco.

Name: To honor Edgard Sengier (1879–1963), Director, Union Minière du Haut Katanga, principal mining company in the former Belgian Congo.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 103963.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1047–1048. (2) Hutton, C.O. (1957) Sengierite from Bisbee, Arizona. Amer. Mineral., 42, 408–411. (3) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Sur. Bull. 1064, 258–260. (4) Piret, P., J.-P. Declercq, and D. Wauters-Stoop (1980) Structure cristalline de la sengiérite. Bull. Minéral., 103, 176–178 (in French with English abs.).