Demesmaekerite  \( \text{Pb}_2\text{Cu}_5(\text{UO}_2)_2(\text{Se}^{4+}\text{O}_3)_6(\text{OH})_6 \cdot 2\text{H}_2\text{O} \)

Crystal Data: Triclinic.  
Point Group: ¹T. Crystals are elongated along [001] and flattened on {100} or {010}, with dominant {100} and {010}, secondary faces typically striated || [101], to 1 cm; in radial aggregates.

Physical Properties:  
Hardness = 3–4  D(meas.) = 5.28(4)  D(calc.) = 5.42  Radioactive.

Optical Properties:  
Translucent to opaque.  
Color: Bottle-green to pale olive-green, becoming brownish green with dehydration.  
Optical Class: Biaxial (+).  
Pleochroism: \( X' = \) yellow-green; \( Y' = \) brown.  \( \alpha = 1.835(5) \) (\( \alpha' \)) \( \beta = \) n.d.  \( \gamma = 1.910(5) \) (\( \gamma' \)) \( 2V(\text{meas.}) = \) n.d.

Cell Data:  
Space Group: \( P\overline{1} \).  
\( a = 11.955(5) \)  \( b = 10.039(4) \)  \( c = 5.639(2) \)  \( \alpha = 89.78(4)^\circ \)  \( \beta = 100.36(4)^\circ \)  \( \gamma = 91.34(4)^\circ \)  \( Z = 1 \)

X-ray Powder Pattern:  
Musonoi mine, Congo.  
2.97 (FFF), 5.42 (FF), 5.89 (F), 3.34 (F), 5.14 (mF), 4.72 (mF), 4.67 (mF)

Chemistry:  
\[
\begin{array}{c|c|c}
\text{Composition} & \text{(1)} & \text{(2)} \\
\hline
\text{SeO}_2 & 30.9 & 30.65 \\
\text{UO}_3 & 27.6 & 26.34 \\
\text{PbO} & 19.4 & 20.55 \\
\text{CuO} & 18.2 & 18.31 \\
\text{H}_2\text{O} & 4.2 & 4.15 \\
\hline
\text{Total} & 100.3 & 100.00 \\
\end{array}
\]
(1) Musonoi mine, Congo; \( \text{H}_2\text{O} \) by the Penfield method; corresponds to \( \text{Pb}_{1.87}\text{Cu}_{4.93}(\text{UO}_2)_{2.08}(\text{SeO}_3)_6(\text{OH})_{6.04} \cdot 2\text{H}_2\text{O} \).  
(2) \( \text{Pb}_2\text{Cu}_5(\text{UO}_2)_2(\text{SeO}_3)_6(\text{OH})_6 \cdot 2\text{H}_2\text{O} \).

Occurrence: Rare in the lower oxidized portions of a selenium-bearing Cu–Co deposit.

Association:  
Cuprosklodowskite, kasolite, guilleminite, derriksite, chalcomenite, malachite, selenian digenite.

Distribution: From the Musonoi Co–Cu mine, near Kolwezi, Katanga Province, Congo (Shaba Province, Zaire).

Name: Honors Gaston Demesmaeker (1911–), Belgian mining geologist, Director, Geological Department, Union Minière du Haut Katanga.


References:  
(3) Ginderow, D. and F. Cesbron (1983) Structure de la demesmaekerite, \( \text{Pb}_2\text{Cu}_5(\text{SeO}_3)_6(\text{UO}_2)_2(\text{OH})_6 \cdot 2\text{H}_2\text{O} \). Acta Cryst., 39, 824–827 (in French).  