Pinalite $Pb_3W^{6+}O_5Cl_2$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As bladed acicular crystals, to 0.5 mm, elongated along [001], flattened on {010}, terminated by {$h0l$}; in slightly divergent sprays. *Twinning:* About [010], yielding penetration twins by rotation.

Physical Properties: *Tenacity:* Brittle. Hardness = n.d. D(meas.) = n.d. D(calc.) = 7.78

Optical Properties: Transparent. *Color:* Bright yellow, golden, orange, pale yellow.
Luster: Adamantine.
Optical Class: Biaxial (+). *Orientation:* $X = b$; $Y = c$; $Z = a$. *Dispersion:* $r > v$, moderate.
$\alpha = 2.490$ $\beta = 2.495$ $\gamma = 2.505$ 2V(meas.) = 70° 2V(calc.) = 70.5°

Cell Data: *Space Group: Amam.* $a = 11.073(2)$ $b = 13.067(3)$ $c = 5.617(1)$ $Z = 4$

X-ray Powder Pattern: Mammoth-St. Anthony mine, Arizona, USA.
2.926 (10), 3.778 (9), 1.642 (5), 3.284 (4), 2.814 (4), 6.52 (3), 2.770 (3)

Chemistry:

	(1)	(2)
WO_3	23.3	24.24
PbO	70.7	70.02
Cl	7.1	7.41
$-O = Cl_2$	1.6	1.67
Total	99.5	100.00

(1) Mammoth-St. Anthony mine, Arizona, USA; by electron microprobe, corresponding to $Pb_{3.09}W_{0.98}O_{5.04}Cl_{1.95}$. (2) $Pb_3WO_5Cl_2$.

Occurrence: A late-stage secondary mineral in the oxidized zone of a base-metal deposit.

Association: Chromian leadhillite, cerussite, matlockite, diaboleite, caledonite, connellite, iranite, murdochite, fluorite, quartz.

Distribution: From the Mammoth-St. Anthony mine, Tiger, Pinal Co., Arizona, USA.

Name: For Pinal Co., Arizona, USA (in turn named for the Pinal Indians), where the mineral was first noted to occur.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 53775; Harvard University, Cambridge, Massachusetts, 119858; National Museum of Natural History, Washington, D.C., USA, 165890.

References: (1) Dunn, P.J., J.D. Grice, and R.A. Bideaux (1989) Pinalite, a new lead tungsten chloride mineral from the Mammoth mine, Pinal County, Arizona. Amer. Mineral., 74, 934–935.
(2) Grice, J.D. and P.J. Dunn (2000) Crystal-structure determination of pinalite. Amer. Mineral., 85, 806–809.