**Popovite**

\[ \text{Cu}_5\text{O}_2(\text{AsO}_4)_2 \]

**Crystal Data:** Triclinic.  
*Point Group*: \(\overline{1}\).  
As prismatic, tabular or lamellar crystals, to 0.2 mm.

**Physical Properties:**  
*Cleavage*: None.  
*Fracture*: Uneven.  
*Tenacity*: Brittle.  
Hardness = \(~3.5\)  
\(D(\text{meas.}) = \text{n.d.}\)  
\(D(\text{calc.}) = 5.30\)

**Optical Properties:**  
*Color*: Olive-green to dark olive-green, light yellow-green.  
*Cleavage*: None.  
*Fracture*: Uneven.  
*Tenacity*: Brittle.  
*Hardness = \(~3.5\)  
\(D(\text{meas.}) = \text{n.d.}\)  
\(D(\text{calc.}) = 5.30\)

**Optical Class:** Biaxial (+).  
\(\alpha = 1.84(1)\)  
\(\beta = 1.86\)  
\(\gamma = 1.96(1)\)  
\(2V(\text{meas.}) = 50(20)^\circ\)  
\(2V(\text{calc.}) = \text{n.d.}\)  
*Dispersion*: Strong, \(r < \nu\).  
*Pleochroism*: Distinct; \(Z = \text{olive-green with a grayish hue}, \ X = \text{n.d.}, \ Y = \text{green}\).  
*Absorption*: \(X > Z\).

**Cell Data:**  
*Space Group*: \(\overline{P\overline{1}}\).  
\(a = 5.1450(3)\)  
\(b = 6.2557(3)\)  
\(c = 6.2766(4)\)  
\(\alpha = 100.064(5)^\circ\)  
\(\beta = 96.351(5)^\circ\)  
\(\gamma = 95.100(5)^\circ\)  
\(Z = 1\)

**X-ray Powder Pattern:**  
Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia.  
2.927 (100), 2.968 (90), 2.768 (67), 2.462 (67), 2.513 (55), 3.465 (43), 3.715 (36)

**Chemistry:**  
(1)  
\(\text{CuO} \ 63.28\)  
\(\text{ZnO} \ 0.56\)  
\(\text{V}_2\text{O}_5 \ 0.12\)  
\(\text{As}_2\text{O}_5 \ 35.80\)  
\(\text{SO}_3 \ 0.27\)  
Total 100.03

(2)  
\(\text{Cu}_5\text{O}_2(\text{AsO}_4)_2 \ 36.62\)

**Occurrence:** Formed as sublimates on basaltic scoria around an active volcanic fumarole.

**Association:** Ericlaxmanite, kozyrevskite, urusovite, lammerite, lammerite-\(\beta\), johillerite, bradaczekite, tenorite, hematite, aphthitalite, anhydrite, langbeinite, calcio-langbeinite, As-bearing orthoclase, anhydrite, langbeinite, calcio-langbeinite, arcane, wulfite, krasheninnikovite, steklite, palmiterite, tilasite, svabite, alarsite, Cu-gahnite, OH-free fluoborite.

**Distribution:** From the Arsenatnaya fumarole, Second scoria cone of the Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka, Russia.

**Name:** Honors the Russian mineralogists Vladimir Anatol’evich Popov (b. 1941) and Valentina Ivanovna Popova (b. 1941), Institute of Mineralogy, Urals Branch, Russian Academy of Sciences, Miass, Chelyabinsk Oblast, Russia.

**Type Material:** A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94135).

**References:**  