Kobyashevite  \( \text{Cu}_5(\text{SO}_4)_{2(\text{OH})_6}\cdot4\text{H}_2\text{O} \)

**Crystal Data:** Triclinic.  \( \text{Point Group: } \bar{1}. \)  As prismatic crystals, typically curved or split, to 0.2 mm, in crusts to 2 mm.

**Physical Properties:**  \( \text{Cleavage: } \text{Distinct on } \{010\}. \)  \( \text{Fracture: } \text{Stepped}. \)  \( \text{Tenacity: } \text{Brittle}. \)
Hardness = 2.5  \( \text{D(meas.)} = \text{n.d.} \)  \( \text{D(calc.)} = 3.16 \)

**Optical Properties:** Transparent.  \( \text{Color: } \text{Bluish-green to turquoise-blue}. \)  \( \text{Streak: } \text{Bluish green}. \)  
\( \text{Luster: } \text{Vitreous}. \)  
\( \text{Optical Class: } \text{Biaxial (–)}. \)  \( \alpha = 1.602(4) \)  \( \beta = 1.666(5) \)  \( \gamma = 1.679(5) \)  
\( 2\nu(\text{meas.}) = 50(10)^\circ \)  \( 2\nu(\text{calc.}) = 47^\circ \)  
\( \text{Dispersion: } r < \nu, \text{ strong.} \)  
\( \text{Orientation: } Z \approx \text{elongation}. \)  
\( \text{Pleochroism: Medium, in bluish-green.} \)  
\( \text{Absorption: } Z > Y > X. \)

**Cell Data:**  \( \text{Space Group: } P\bar{1}. \)  
\( a = 6.0731(6) \)  \( b = 11.0597(13) \)  \( c = 5.5094(6) \)  
\( \alpha = 102.883(9)^\circ \)  \( \beta = 92.348(8)^\circ \)  \( \gamma = 92.597(9)^\circ \)  
\( Z = 1 \)

**X-ray Powder Pattern:** Kapital’naya mine, Vishnevye Mountains, South Urals, Russia.
10.84 (100), 5.399 (40), 3.590 (16), 2.691 (16), 5.178 (12), 2.653 (12), 2.583 (12)

**Chemistry:**
\[
\begin{array}{ll}
\text{CuO} & 57.72 \\
\text{ZnO} & 0.09 \\
\text{FeO} & 0.28 \\
\text{SO}_3 & 23.52 \\
\text{H}_2\text{O} & [18.39] \\
\text{Total} & 100.00
\end{array}
\]

(1) Kapital’naya mine, Vishnevye Mountains, South Urals, Russia; average of 4 electron microprobe analyses supplemented by IR spectroscopy, H\(_2\)O by difference; corresponding to Cu\(_{4.96}\)Fe\(_{0.03}\)Zn\(_{0.01}\)S\(_{2.01}\)O\(_{8.04}\)(OH)\(_{5.96}\)\( \cdot 4\)H\(_2\)O.

**Mineral Group:** Devilline group.

**Occurrence:** As a secondary mineral in pyrite-chalcopyrite veins cutting fenites in an alkaline igneous complex.

**Association:** Calcite, quartz.

**Distribution:** At the Kapital’naya mine, Vishnevye Mountains, Chelyabinsk Oblast’, South Urals, Russia.

**Name:** Honors Russian mineralogist Yuriy Stepanovich Kobyashev (1935-2009), a specialist on the mineralogy of the Urals.

**Type Material:** A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4152/1).