Derbylite

\((\text{Ti}, \text{Fe}^{3+}, \text{Fe}^{2+})_7\text{Sb}^{3+}\text{O}_{13}(\text{OH})\)

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Crystal Data: Monoclinic. **Point Group:** \(2/m\). As prismatic crystals, to 2 mm, elongate along [001], showing many forms, mostly \(\{hk0\}\); in small grains. **Twinning:** On \(\{011\}\) or \(\{T53\}\), commonly as cruciform twins and trillings.

**Physical Properties:** **Fracture:** Conchoidal. **Tenacity:** Very brittle. **Hardness = 5** \(\text{VHN} = 1033–1121\) (100 g load). \(\text{D(meas.)} = 4.53–4.62\) \(\text{D(calc.)} = [4.50]\)

**Optical Properties:** Opaque, translucent in small grains. **Color:** Pitch-black; dark brown when translucent; in reflected light, gray with bluish green internal reflections. **Luster:** Resinous to metallic.

**Optical Class:** Biaxial (+). **Orientation:** \(X = a; Y = b; Z = c\). \(\alpha = 2.45\) \(\beta = 2.45\) \(\gamma = 2.51\) 2\(V\)(meas.) = \(\sim 0^\circ\)

**Cell Data:** **Space Group:** \(P2_1/m\). \(a = 7.156–7.160\) \(b = 14.347–14.354\) \(c = 4.970–4.980\) \(\beta = 104.61^\circ–104.69^\circ\) \(Z = 2\)

**X-ray Powder Pattern:** Buca della Vena mine, Italy.

2.853 (100), 2.674 (73), 3.186 (43), 3.118 (33), 2.479 (23), 2.393 (23), 3.997 (18)

**Chemistry:**

\[
\begin{array}{ccc}
\text{Chemistry:} & (1) & (2) \\
\text{TiO}_2 & 36.6 & 40.20 \\
\text{Al}_2\text{O}_3 & 3.8 & \\
\text{Fe}_2\text{O}_3 & 36.0 & 31.83 \\
\text{Cr}_2\text{O}_3 & 0.3 & \\
\text{Sb}_2\text{O}_3 & 21.5 & 19.80 \\
\text{FeO} & 4.44 & \\
\text{H}_2\text{O} & [1.3] & [1.24] \\
\text{Total} & [99.5] & [97.51] \\
\end{array}
\]

(1) Tripuhy, Brazil; by electron microprobe, \(\text{H}_2\text{O}\) calculated for one (OH). (2) Buca della Vena mine, Italy; by electron microprobe, \(\text{Ti}\) by AA, \(\text{Fe}^{2+}:\text{Fe}^{3+}\) separately determined, \(\text{H}_2\text{O}\) calculated for one (OH); corresponds to \((\text{Ti}_{3.66}\text{Fe}_{2.90}\text{Fe}^{2+}_{0.45})\Sigma=7\text{Sb}^{3+}\text{O}_{13.11}(\text{OH})\)

**Occurrence:** In cinnabar-bearing placer gravels (Tripuhy, Brazil); in microcrystalline barite and in cavities within metasomatically mineralized dolostones (Buca della Vena mine, Italy).

**Association:** Roméite, tripuhyite, monazite, xenotime, zircon, rutile, hematite, muscovite (Tripuhy, Brazil); pyrite, sphalerite, bournonite, schafarzikite, versiliaite, apuanite, dolomite, barite (Buca della Vena mine, Italy).

**Distribution:** From around Tripuhy, near Ouro Preto, Minas Gerais, Brazil. In the Buca della Vena iron mine, north of Stazzema, Apuan Alps, Tuscany, Italy.

**Name:** For the American geologist Orville Adelbert Derby (1851–1915), at one time Director of the Brazilian Geological Survey.

**Type Material:** The Natural History Museum, London, England, 80143.

**References:**


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