Zoisite

\( \text{Ca}_2\text{Al}_3(\text{Si}_4\text{O}_{14})(\text{Si}_2\text{O}_7)\text{O(OH)} \)

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Crystal Data:  Orthorhombic.  Point Group:  \( 2/m 2/m 2/m \).  Crystals prismatic, to 10 cm, typically deeply striated || [010] and poorly terminated; columnar to compact, massive.


Optical Properties:  Transparent to translucent.  Color: White, gray, greenish brown, greenish gray, pink, blue, purple; colorless to pink in thin section.  Luster: Vitreous, pearly on cleavage.  Optical Class: Biaxial (+).  Pleochroism: \( X = \) pale pink to red-violet; \( Y = \) nearly colorless to bright pink or deep blue; \( Z = \) pale yellow to yellow-green.  Orientation: \( X = b; Y = c; Z = a \).  Dispersion: \( r > v \) or \( r < v \), strong.  \( \alpha = 1.685–1.707 \)  \( \beta = 1.688–1.711 \)  \( \gamma = 1.697–1.725 \) 2V(meas.) = 0°–69°

Cell Data:  Space Group:  \( \text{Pnma} \).  \( a = 16.1909(15) \)  \( b = 5.5466(5) \)  \( c = 10.0323(6) \)  \( Z = 4 \)

X-ray Powder Pattern:  Synthetic.

2.693 (100), 2.874 (65), 4.03 (50), 8.09 (40), 2.019 (35), 1.601 (35), 5.01 (30)

Chemistry:  (1)  (1)

<table>
<thead>
<tr>
<th></th>
<th>( \text{SiO}_2 )</th>
<th>39.55</th>
<th>( \text{Al}_2\text{O}_3 )</th>
<th>33.39</th>
<th>( \text{Fe}_2\text{O}_3 )</th>
<th>0.04</th>
<th>( \text{V}_2\text{O}_3 )</th>
<th>0.20</th>
<th>( \text{MgO} )</th>
<th>0.07</th>
<th>( \text{CaO} )</th>
<th>[24.44]</th>
<th>( \text{SrO} )</th>
<th>0.05</th>
<th>( \text{H}_2\text{O}^+ )</th>
<th>2.00</th>
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<tbody>
<tr>
<td>Total</td>
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<td>[99.74]</td>
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(1) “Umbo Valley,” Tanzania; \( \text{CaO} \) originally given as 22.44%, and total given as 99.69%; corresponds to \( \left( \text{Ca}_{1.99}\text{Mg}_{0.01} \right) \Sigma=2.00(\text{Al}_{2.98}\text{V}_{0.01})\Sigma=2.99\text{Si}_3\text{O}_{12}(\text{OH})_{1.01} \).

Polymorphism & Series:  Dimorphous with clinozoisite.

Mineral Group:  Epidote group.

Occurrence:  Typically in medium-grade regionally metamorphosed crystalline schists formed from igneous, sedimentary, or metamorphic rocks relatively high in calcium; in eclogites and blueschist facies metamorphic rocks.


Distribution:  Widespread.  Classic localities for fine crystals and decorative rocks follow.  On the Saualpe, Carinthia, and in the Zillertal, Tirol, Austria.  From near Trondheim, Norway.  In the USA, at Goshen and Williamsburg, Hampshire Co., Massachusetts; in the Keystone quarry, near Corneg, Chester Co., Pennsylvania; at Milford Heights, Baltimore Co., Maryland.  From around Spruce Pine, Mitchell Co., North Carolina; from Ducktown, Polk Co., Tennessee; in Washington, in the Tunk Creek area, east of Riverside, Okanogan Co.  From Asbestos, Quebec, Canada.  In the Juarez district, Baja California, Mexico.  From Tanzania, exceptional gem material in the Merelani Hills, Lelatema Mountains, 40 km southeast of Arusha.  Well crystallized from Alchuri village, Shigar Valley, Baltistan, Pakistan.

Name:  For Siegmund Zois, Baron von Edelstein (1747–1819), Austrian supporter of mineralogy who supplied the first specimens.


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