

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As portions of an anhedral crystal consisting of a mosaic of 10-100 μm-sized subgrains containing abundant inclusions.

**Physical Properties:** *Cleavage:* {110}. Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.68

**Optical Properties:** Translucent. *Color:* Dark green; in transmitted light, light yellow to pale green. *Luster:* Vitreous.

*Optical Class:* Biaxial (+).  $\alpha = 1.68(1)$   $\beta = 1.69(1)$   $\gamma = 1.70(1)$  2V(meas.) = 70°-90°

*Pleochroism:* X = Y = light yellow; Z = light green. *Orientation:* Y = b; Z ^ c = 35°-45°.

*Dispersion:* r > v; strong. *Absorption:* Z > X = Y.

**Cell Data:** Space Group: C2/c.  $a = 9.82(2)$   $b = 9.00(1)$   $c = 5.27(2)$   $\beta = 105.6(2)^\circ$  Z = 4

**X-ray Powder Pattern:** Franklin, New Jersey, USA.

3.02 (100), 2.537 (80), 2.96 (40), 2.589 (30), 2.022 (30), 6.49 (10), 2.227 (10)

|                                |            |
|--------------------------------|------------|
| <b>Chemistry:</b>              | (1)        |
| SiO <sub>2</sub>               | 48.4       |
| Al <sub>2</sub> O <sub>3</sub> | 1.2        |
| Fe <sub>2</sub> O <sub>3</sub> | [3.8]      |
| FeO                            | [5.7]      |
| MnO                            | 5.8        |
| ZnO                            | 12.6       |
| MgO                            | 2.4        |
| CaO                            | 21.3       |
| <u>Na<sub>2</sub>O</u>         | <u>0.7</u> |
| Total                          | 101.9      |

(1) Franklin, New Jersey, USA; by electron microprobe, Fe<sup>2+</sup>:Fe<sup>3+</sup> by charge balance; corresponds to (Ca<sub>0.92</sub>Na<sub>0.06</sub>Mn<sub>0.02</sub>)<sub>Σ=1.00</sub>(Zn<sub>0.37</sub>Fe<sup>2+</sup><sub>0.19</sub>Mn<sub>0.18</sub>Mg<sub>0.14</sub>Fe<sup>3+</sup><sub>0.12</sub>)<sub>Σ=1.00</sub>(Si<sub>1.94</sub>Al<sub>0.06</sub>)<sub>Σ=2.00</sub>O<sub>6</sub>.

**Mineral Group:** Ca pyroxene group.

**Occurrence:** In a metamorphosed stratiform zinc deposit, apparently formed under relatively high activity of sulfur and oxygen. Formed at high pressures ( $P > 0.8$  GPa); at lower pressures and temperatures (>650 °C) decomposes to willemite, hardystonite, and quartz.

**Association:** Calcite, gahnite, willemite, genthelvite, garnet, albite, sphalerite.

**Distribution:** From Franklin, Sussex Co., New Jersey, USA.

**Name:** In honor of Dr. Pete J. Dunn, Department of Mineral Sciences (1984-2007), Smithsonian Institution, Washington, D.C., USA, for contributions to the mineralogy of Franklin and Sterling Hill, New Jersey, USA.

**Type Material:** Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan; National Museum of Natural History, Washington, D.C., USA (NMNH 162211).

**References:** (1) Essene, E.J. and D.R. Peacor (1987) Petedunnite (CaZnSi<sub>2</sub>O<sub>6</sub>); a new zinc clinopyroxene from Franklin, New Jersey, and phase equilibria for zincian pyroxenes. *Amer. Mineral.*, 72, 157-166. (2) Huber, A.L., S. Heuss-Abichler, K.T. Fehr, and G.D. Bromiley (2012) Petedunnite (CaZnSi<sub>2</sub>O<sub>6</sub>): Stability and phase relations in the system CaO-ZnO-SiO<sub>2</sub>. *Amer. Mineral.*, 97, 739-749.