Ernstite

\[(\text{Mn}^{2+}_{1-x}\text{Fe}^{3+}_{x})\text{Al(PO}_4\text{)}\text{O}_x(\text{OH})_{2-x}\ (x = 0.33)\]

Crystal Data: Monoclinic. *Point Group*: 2/m or m. As crystals, showing \{110\}, \{211\}, and \{211\}, rare \{100\} and \{010\}, to 15 mm, in radial aggregates.

**Physical Properties:** 
*Cleavage:* On \{100\}, very good; on \{010\}, good. Hardness = 3–3.5 
\[\text{D(meas.) = 3.07} \quad \text{D(calc.) = 3.086}\]

**Optical Properties:** Semitransparent. *Color:* Yellow-brown. 
*Optical Class:* Biaxial (−). *Pleochroism:* X = yellowish brown; Y = red-brown; Z = pale yellow. 
*Orientation:* Z = b; Y \wedge c = −4°. *Dispersion:* \(r > v\). \(\alpha = 1.678(3)\) \(\beta = 1.706(3)\) \(\gamma = 1.721(3)\) 
\[2V(\text{meas.}) = \text{n.d.} \quad 2V(\text{calc.}) = 74°\]

**Cell Data:** 
*Space Group:* A2/a or Aa.  
\[a = 13.32(1) \quad b = 10.497(5) \quad c = 6.969(4)\]  
\[\beta = 90°22(20)' \quad Z = 8\]

**X-ray Powder Pattern:** Farm Davib-East, Namibia. 

**Chemistry:**

\[
\begin{array}{ccc}
\text{Component} & \text{Formula} & \text{Percentage} \\
\hline
\text{P}_2\text{O}_5 & (1) & 29.86 \\
\text{Al}_2\text{O}_3 & & 24.33 \\
\text{Fe}_2\text{O}_3 & & 11.83 \\
\text{FeO} & & 0.44 \\
\text{MnO} & & 17.83 \\
\text{MgO} & & 1.01 \\
\text{CaO} & & 0.84 \\
\text{H}_2\text{O}^+ & & 13.86 \\
\text{Total} & & (100.00)
\end{array}
\]

(1) Farm Davib-East, Namibia: recalculated after deduction of \(\text{SiO}_2\) 0.48% from an original total of 99.96%; corresponds to \((\text{Mn}^{2+}_{0.56}\text{Fe}^{3+}_{0.33}\text{Mg}_{0.06}\text{Ca}_{0.03}\text{Fe}^{2+}_{0.01})_{2+} = 0.99 \text{Al}^{3+}_{1.00}(\text{PO}_4)\text{[O}_0.33(\text{OH})_{1.67}]_{2-2.00}\)

**Occurrence:** Formed by oxidation of eosphorite in a granite pegmatite (Farm Davib-East, Namibia).

**Association:** Eosphorite (Farm Davib-East, Namibia).

**Distribution:** Found on the Farm Davib-East, near Karibib, southern Erongo Mountains, Namibia. At St. John’s quarry, near Kapunda, Mount Lofty Ranges, South Australia.

**Name:** To honor Dr. Theodor K.H. Ernst (1904–1983), Professor of Mineralogy, Erlangen University, Erlangen, Germany.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 145620.