Mountkeithite  \((\text{Mg, Ni})_{11}(\text{Fe}^{3+}, \text{Cr}, \text{Al})_{3}(\text{SO}_4, \text{CO}_3)_{3.5}(\text{OH})_{24} \cdot 11\text{H}_2\text{O}\)

**Crystal Data:** Hexagonal (by analogy to pyroaurite).  **Point Group:** n.d. Scaly crystals, to 1 mm, in rosettes and whorl-like aggregates.

**Physical Properties:**  **Cleavage:** Perfect on \{0001\}.  **Tenacity:** Friable.  **Hardness:** = “Soft”.  
\(D(\text{meas.}) = 2.12\)  \(D(\text{calc.}) = 1.95\)

**Optical Properties:**  **Translucency:** Color: White, pale pink.  **Luster:** Pearly.  **Optical Class:** Uniaxial (-) or biaxial (-).  **Pleochroism:** Weak; white to very pale pink.  **Orientation:** Length-slow.  \(\omega = 1.52\)  \(\epsilon = 1.51\)  \(2V(\text{meas}) = \text{Small}\)

**Cell Data:**  **Space Group:** n.d.  \(a = 10.698\)  \(c = 22.545\)  \(Z = 2\)

**X-ray Powder Pattern:** Mount Keith, Australia.  
11.30 (10), 5.63 (8), 3.765 (6), 1.554 (5), 2.645 (4), 2.545 (4), 1.505 (3)

**Chemistry:**

\[
\begin{align*}
\text{SO}_3 & \quad 14.7 \\
\text{CO}_3 & \quad 3.9 \\
\text{Al}_2\text{O}_3 & \quad 2.6 \\
\text{Fe}_2\text{O}_3 & \quad 8.3 \\
\text{Cr}_2\text{O}_3 & \quad 6.1 \\
\text{NiO} & \quad 6.1 \\
\text{CuO} & \quad 0.1 \\
\text{MgO} & \quad 31.7 \\
\text{H}_2\text{O} & \quad 30.6 \\
\text{Total} & \quad 104.1
\end{align*}
\]

(1) Mount Keith deposit, Australia; by electron microprobe, average of 20 analyses, total \(\text{Fe as Fe}_2\text{O}_3\), \(\text{CO}_2\), and \(\text{H}_2\text{O}\) by microchemical techniques; with \((\text{OH})^{1-} \cdot \text{H}_2\text{O}\) calculated for charge balance, then corresponds to \((\text{Mg}_{10.76}\text{Ni}_{1.12}\text{Cu}_{0.02})\Sigma=11.90(\text{Fe}_{1.42}\text{Cr}_{1.10}\text{Al}_{0.71})\Sigma=3.23\) \([\text{SO}_4]_{2.52}(\text{CO}_3)_{1.21}\Sigma=3.73(\text{OH})_{26.07} \cdot 10.20\text{H}_2\text{O}\).

**Occurrence:** Rare in a vein in serpentinite in a disseminated nickel sulfide deposit, formed by low-temperature alteration of stichtite by sulfate-rich solutions.

**Association:** Stichtite, morenosite, hexahydrite, pyroaurite, pyrite, magnetite, magnesite.

**Distribution:** From the Mount Keith nickel deposit, 400 km north-northwest of Kalgoorlie, Western Australia.

**Name:** For the Mount Keith deposit, Australia, in which it occurs.


**References:**