Hutcheonite

\[ \text{Ca}_3\text{Ti}_2(\text{SiAl}_2)\text{O}_{12} \]

**Crystal Data**: Cubic.  *Point Group*: 4/m 3 2/m.  As irregularly-shaped crystals, to 4 μm.

*D(meas.)* = n.d.  *D(calc.)* = 3.86

*Optical Class*: n.d.

**Cell Data**:  *Space Group*: Ia3.  *\(a\) = 11.843*  *Z = 8*

**X-ray Powder Pattern**: Calculated pattern.

\[ \begin{array}{ccc}
2.648 & (100) & , 1.583 & (63) , 2.961 & (54) , 2.417 & (41) , 0.806 & (30) , 1.642 & (27) , 1.292 & (18)
\end{array} \]

**Chemistry**:

\[
\begin{array}{ccc}
\text{CaO} & 34.6 & 34.3 \\
\text{TiO}_2 & 25.3 & 32.6 \\
\text{SiO}_2 & 20.9 & 12.3 \\
\text{Al}_2\text{O}_3 & 15.7 & 20.8 \\
\text{MgO} & 2.1 & \\
\text{FeO} & 0.7 & \\
\text{V}_2\text{O}_3 & 0.5 & \\
\text{Total} & 99.8 & 100.0
\end{array}
\]

(1) Allende meteorite; average of 6 electron microprobe analyses supplemented by Raman spectroscopy; corresponds to \(\text{Ca}_{2.99}(\text{Ti}^{4+}_{1.53}\text{Mg}_{0.25}\text{Al}_{0.17}\text{Fe}^{2+}_{0.05}\text{V}^{3+}_{0.03})(\text{Si}_{1.68}\text{Al}_{1.32})\text{O}_{12}\).

(2) \(\text{Ca}_3\text{Ti}_2(\text{SiAl}_2)\text{O}_{12}\).

**Mineral Group**: Garnet supergroup, schorlomite group with \(\text{Al}^{3+} > \text{Fe}^{3+}\) in the Z site.

**Occurrence**: A secondary phase, apparently formed by iron-alkali-halogen metasomatic alteration of primary CAI phases like melilite, perovskite, and Ti-Al-diopside.

**Association**: Monticellite, grossular, wadalite.

**Distribution**: In a Ca-Al-rich inclusion (CAI) Egg-3 in the Allende CV3 carbonaceous chondrite meteorite.

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**Type Material**: In the G.J. Wasserburg Meteorite Collection, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California, USA (MQM803).