Huangite  \(\text{Ca}_{0.5}\text{Al}_{3}(\text{SO}_{4})_{2}(\text{OH})_{6}\)

**Crystal Data:** Hexagonal. \(\text{Point Group}: \overline{3} 2/m\). As imperfect zoned crystals, to 70 \(\mu\text{m}\), and in rounded aggregates.

**Physical Properties:** Cleavage: On \{0001\}, perfect. Hardness = n.d. \(D(\text{meas.}) = n.d\). \(D(\text{calc.}) = 2.80\)


**Cell Data:** Space Group: \(R\overline{3}m\). \(a = 6.983(4)\) \(c = 33.517(9)\) \(Z = 6\)

**X-ray Powder Pattern:** El Indio mine, Chile. 2.97 (100), 4.91 (75), 2.231 (51), 1.899 (43), 1.375 (40), 1.745 (37), 2.455 (35)

**Chemistry:**

\[
\begin{align*}
\text{SO}_3 & \quad 38.78 \\
\text{P}_2\text{O}_5 & \quad 0.23 \\
\text{Al}_2\text{O}_3 & \quad 38.62 \\
\text{Fe}_2\text{O}_3 & \quad 0.10 \\
\text{CaO} & \quad 6.17 \\
\text{SrO} & \quad 0.04 \\
\text{BaO} & \quad 0.13 \\
\text{Na}_2\text{O} & \quad 0.43 \\
\text{K}_2\text{O} & \quad 0.67 \\
\text{F} & \quad 0.11 \\
\text{H}_2\text{O} & \quad 13.60 \\
\text{=} & \quad 0.05 \\
\text{Total} & \quad 98.83
\end{align*}
\]

(1) El Indio mine, Chile; by electron microprobe, average of seven analyses; corresponds to \((\text{Ca}_{0.44}\text{Na}_{0.06}\text{K}_{0.06})\Sigma=0.56(\text{Al}_{2.98}\text{Fe}_{0.01})\Sigma=3.00(\text{S}_{0.96}\text{O}_{4.88})\Sigma=6.00\).

**Mineral Group:** Alunite group.

**Occurrence:** A product of acid sulfate hydrothermal alteration of rhyolite tuffs and andesites.

**Association:** Kaolinite, pyrite, woodhouseite (El Indio mine, Chile); alunite, natroalunite, minamiite (Okumanza, Japan).

**Distribution:** From the El Indio mine, El Indio-Tambo district, east of La Serena, Coquimbo, Chile. At Okumanza, near the Kusatsu-Shirane volcano, Gunma Prefecture, Japan.

**Name:** Honors Yunhui Huang (1926– ), Chinese mineralogist, Institute of Mineral Deposit Geology and Mineral Resources, Beijing, China, in part for her contributions to the study of contact-metamorphic beryllium deposits.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 170208, 170209.

**References:**

1. Li, G., D.R. Peacor, E.J. Essene, D.R. Brosnahan, and R.E. Beane (1992) Walthierite, \(\text{Ba}_{0.5}\text{Al}_{3}(\text{SO}_{4})_{2}(\text{OH})_{6}\), and huangite, \(\text{Ca}_{0.5}\text{Al}_{3}(\text{SO}_{4})_{2}(\text{OH})_{6}\), two new minerals of the alunite group from the Coquimbo region, Chile. Amer. Mineral., 77, 1275–1284.

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