

# Huangite

# Ca<sub>0.5</sub>Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>

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

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

**Optical Properties:** Transparent to translucent. *Color:* White to pale yellow. *Streak:* White. *Luster:* Vitreous.

*Optical Class:* Uniaxial (+).  $\omega$  = n.d.  $\epsilon$  = n.d.

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

**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:

	(1)
SO <sub>3</sub>	38.78
P <sub>2</sub> O <sub>5</sub>	0.23
Al <sub>2</sub> O <sub>3</sub>	38.62
Fe <sub>2</sub> O <sub>3</sub>	0.10
CaO	6.17
SrO	0.04
BaO	0.13
Na <sub>2</sub> O	0.43
K <sub>2</sub> O	0.67
F	0.11
H <sub>2</sub> O	13.60
–O = F <sub>2</sub>	0.05
Total	98.83

(1) El Indio mine, Chile; by electron microprobe, average of seven analyses; corresponds to (Ca<sub>0.44</sub>Na<sub>0.06</sub>K<sub>0.06</sub>)<sub>Σ=0.56</sub>(Al<sub>2.99</sub>Fe<sub>0.01</sub>)<sub>Σ=3.00</sub>(S<sub>0.96</sub>O<sub>3.88</sub>)<sub>2</sub>[(OH)<sub>5.98</sub>F<sub>0.02</sub>]<sub>Σ=6.00</sub>.

**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, Gumma 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, Ba<sub>0.5</sub>□<sub>0.5</sub>Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>, and huangite, Ca<sub>0.5</sub>□<sub>0.5</sub>Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>, two new minerals of the alunite group from the Coquimbo region, Chile. *Amer. Mineral.*, 77, 1275–1284. (2) Matsubara, S., A. Kato, K. Kiyota, and F. Matsuyama (1998) Huangite from Okumanza, Gunma [sic] Prefecture, Japan. *Mineral. J. (Japan)*, 20, 1–8.