Huangite $Ca_{0.5}Al_3(SO_4)_2(OH)_6$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}\ 2/m$. As imperfect zoned crystals, to 70 μm, 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 (+). ω = n.d. ϵ = n.d.

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:

	(1)
SO_3	38.78
P_2O_5	0.23
Al_2O_3	38.62
Fe_2O_3	0.10
CaO	6.17
SrO	0.04
BaO	0.13
Na_2O	0.43
K_2O	0.67
F	0.11
H_2O	13.60
$-O = F_2$	0.05
Total	98.83

(1) El Indio mine, Chile; by electron microprobe, average of seven analyses; corresponds to $(Ca_{0.44}Na_{0.06}K_{0.06})_{\Sigma=0.56}(Al_{2.99}Fe_{0.01})_{\Sigma=3.00}(S_{0.96}O_{3.88})_2[(OH)_{5.98}F_{0.02}]_{\Sigma=6.00}$.

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, 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, $Ba_{0.5}\square_{0.5}Al_3(SO_4)_2(OH)_6$, and huangite, $Ca_{0.5}\square_{0.5}Al_3(SO_4)_2(OH)_6$, 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.