

**Woodhouseite****CaAl<sub>3</sub>(PO<sub>4</sub>)(SO<sub>4</sub>)(OH)<sub>6</sub>**

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**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . Pseudocubic rhombohedral {10 $\bar{1}$ 2} crystals, to 6 mm, may be tabular {0001}, with curved and striated faces.

**Physical Properties:** *Cleavage:* On {0001}, excellent. Hardness = 4.5 D(meas.) = 3.01 D(calc.) = 3.00

**Optical Properties:** Translucent to transparent. *Color:* Colorless, white, flesh-pink. *Luster:* Vitreous, pearly on {0001}.

*Optical Class:* Uniaxial (+); may exhibit anomalous biaxial sectors.  $\omega = 1.636(3)$   $\epsilon = 1.647(3)$   $2V(\text{meas.}) = 0^\circ\text{--}20^\circ$

**Cell Data:** *Space Group:*  $R\bar{3}m$ .  $a = 6.993(2)$   $c = 16.386(6)$   $Z = 3$

**X-ray Powder Pattern:** Champion mine, California, USA. (ICDD 37-469). 2.932 (100), 2.163 (45), 4.847 (35), 2.971 (35), 3.488 (30), 2.704 (25), 5.658 (20)

**Chemistry:**

	(1)	(2)
SO <sub>3</sub>	17.59	19.33
P <sub>2</sub> O <sub>5</sub>	18.13	17.14
SiO <sub>2</sub>	0.30	
Al <sub>2</sub> O <sub>3</sub>	36.63	36.94
MgO	0.11	
CaO	12.31	13.54
SrO	0.25	
BaO	1.00	
Na <sub>2</sub> O	0.08	
K <sub>2</sub> O	0.02	
H <sub>2</sub> O	13.45	13.05
Total	99.87	100.00

(1) Champion mine, California, USA. (2) CaAl<sub>3</sub>(PO<sub>4</sub>)(SO<sub>4</sub>)(OH)<sub>6</sub>.

**Mineral Group:** Beudantite group.

**Occurrence:** In quartz veins in an andalusite deposit (Champion mine, California, USA); a product of sulphatic argillic wall-rock alteration in hydrothermal vein and disseminated ore deposits, replacing apatite (Summitville, Colorado, USA); rarely a cave deposit, formed from guano.

**Association:** Topaz, augelite, lazulite, pyrophyllite (Champion mine, California, USA).

**Distribution:** From the Champion mine, White Mountains, Mono Co., California, large crystals; in the Summitville district, Rio Grande Co., Colorado, USA. From Brumado, Bahia, Brazil. At La Escondida, about 150 km south-southeast of Antofagasta, Chile. From Hökensås, Västergötland, Sweden. In the Ødegården apatite mines, Bamble, Norway. At the Iron Monarch quarry, Iron Knob, South Australia. In the Jade Lotus Cave, Yangshuo, Jiangxi Province, China.

**Name:** To honor Professor Charles Douglas Woodhouse (1888–1975), University of California, Santa Barbara, California, USA, American mineralogist and mineral collector.

**Type Material:** n.d.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1006–1007. (2) Kato, T. (1971) The crystal structures of goyazite and woodhouseite. Neues Jahrb. Mineral., Monatsh., 241–247. (3) Kato, T. (1977) Further refinement of the woodhouseite structure. Neues Jahrb. Mineral., Monatsh., 54–58.

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