

Hydrobasaluminite

$\text{Al}_4(\text{SO}_4)(\text{OH})_{10} \cdot 12\text{--}36\text{H}_2\text{O}$

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Crystal Data: Monoclinic. *Point Group:* n.d. As rhomb-shaped platelets, to 5 μm , in claylike, powdery, earthy, or porcelaneous masses.

Physical Properties: *Tenacity:* Plastic in aggregates. Hardness = n.d. $D(\text{meas.}) = 1.86$ $D(\text{calc.}) = \text{n.d.}$ Dehydrates irreversibly to basaluminite under low humidity conditions.

Optical Properties: Transparent to translucent. *Color:* Colorless to pale yellow. *Optical Class:* Biaxial (+). $\alpha = 1.466$ $\beta = \text{n.d.}$ $\gamma = 1.477$ $2V(\text{meas.}) = \text{n.d.}$

Cell Data: *Space Group:* n.d. $a = 14.911(5)$ $b = 9.993(2)$ $c = 13.640(5)$ $\beta = 112.40(4)^\circ$ $Z = \text{n.d.}$

X-ray Powder Pattern: Crook Hill Brickyard, England; moist powder. 12.59 (100), 4.693 (11), 3.960 (11), 3.681 (11b), 6.30 (10), 5.26 (10), 5.91 (9)

Chemistry:

	(1)
P_2O_5	0.02
SO_3	13.36
SiO_2	0.30
Al_2O_3	35.20
Fe_2O_3	0.06
H_2O	50.77
Total	99.71

(1) Shoals, Indiana, USA; corresponds to $\text{Al}_{4.14}(\text{SO}_4)_{1.00}(\text{OH})_{10.42} \cdot 11.67\text{H}_2\text{O}$.

Occurrence: Infilling vertical fissures in the weathering zone of siderite–chamosite ironstones (Irchester, England); in cave passages in argillaceous dolostone by the reaction of sulfuric acid with kaolinite (Cottonwood Cave, New Mexico, USA); a reaction product between migrating aluminum-bearing acid sulfate solutions and carbonate concretions (Chickerell, England).

Association: Basaluminite, gypsum, aragonite, halloysite, gibbsite, allophane, “limonite” (Irchester, England); gibbsite, amorphous silica (New Mexico, USA).

Distribution: In England, from the Lodge pit, Irchester, Northamptonshire; on Clifton Hill, Brighton, Sussex; and at the Crook Hill Brickyard, Chickerell, near Weymouth, Dorset. In the USA, from three km west of Shoals, Martin Co., Indiana; in Cottonwood Cave, Guadalupe Mountains, New Mexico; from the Holbrook pit and in the Southwest mine, Bisbee, Cochise Co., Arizona. In Alum Cave, Vulcano, Lipari Islands, Italy.

Name: As the hydrated analog of *basaluminite*.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana’s system of mineralogy, (7th edition), v. II, 586. (2) Sunderman, J.A. and C.W. Beck (1969) Hydrobasaluminite from Shoals, Indiana. *Amer. Mineral.*, 54, 1363–1373. (3) Clayton, T. (1980) Hydrobasaluminite and basaluminite from Chickerell, Dorset. *Mineral. Mag.*, 43, 931–937.