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

**Crystal Data:** Monoclinic.  
**Point Group:** n.d.  
As rhomb-shaped platelets, to 5 \( \mu \text{m} \), in claylike, powdery, earthy, or porcelaneous masses.

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

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

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

**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:**

\[
\begin{array}{l|l}
\text{Component} & \text{Formula} \\
\hline
\text{P}_2\text{O}_5 & 0.02 \\
\text{SO}_3 & 13.36 \\
\text{SiO}_2 & 0.30 \\
\text{Al}_2\text{O}_3 & 35.20 \\
\text{Fe}_2\text{O}_3 & 0.06 \\
\text{H}_2\text{O} & 50.77 \\
\hline
\text{Total} & 99.71 \\
\end{array}
\]

(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:**  