Zaherite, **Al**<sub>12</sub>(SO<sub>4</sub>)<sub>5</sub>(OH)<sub>26</sub>•20H<sub>2</sub>O

**Crystal Data:** Triclinic. **Point Group:** 1 or 1. Fibers, which may be tubular, with a wavy texture, to hundreds of μm, in dense extremely fine-grained aggregates.

**Physical Properties:** Cleavage: One, well-developed. Hardness = ~3.5, in aggregates. D(meas.) = 2.007–2.011 D(calc.) = 2.01 Reversibly hydrates at room temperature, with changes in the most intense X-ray diffraction peak position.

**Optical Properties:** Semitransparent. Color: Chalk-white to pale bluish green; colorless in transmitted light. Luster: Pearly to earthy. Optical Class: Biaxial (+), with extremely low birefringence, ~0.001. α = 1.498(1) β = n.d. γ = 1.499(1) 2V(meas.) = Moderate.

**Cell Data:** Space Group: P1 or P1. 

\[
\begin{align*}
    a &= 18.475(0.942) \\
    b &= 19.454(0.591) \\
    c &= 3.771(0.231) \\
    α &= 95°14′6′′(1°6.60′) \\
    β &= 91°21.80′(2°7.38′) \\
    γ &= 80°14.40′(1°9.24′) \\
    Z &= 1
\end{align*}
\]

**X-ray Powder Pattern:** Punjab Salt Range, Pakistan.

17.9 (100), 3.22 (8), 4.61 (7), 4.58 (7), 4.56 (7), 3.55 (6), 9.5 (5), 4.82 (5)

**Chemistry:**

\[
\begin{align*}
    \text{SO}_3 &\quad 24.87 &\quad 24.63 &\quad 24.92 \\
    \text{P}_2\text{O}_5 &\quad 0.02 &\quad 0.06 \\
    \text{CO}_2 &\quad 0.00 \\
    \text{SiO}_2 &\quad 0.63 &\quad 0.11 \\
    \text{Al}_2\text{O}_3 &\quad 37.79 &\quad 37.85 &\quad 38.08 \\
    \text{Fe}_2\text{O}_3 &\quad 0.08 \\
    \text{MnO} &\quad 0.01 \\
    \text{MgO} &\quad 0.01 &\quad 0.19 \\
    \text{CaO} &\quad 0.09 &\quad 0.21 \\
    \text{Na}_2\text{O} &\quad 0.03 &\quad 0.08 \\
    \text{K}_2\text{O} &\quad 0.01 &\quad 0.01 \\
    \text{H}_2\text{O} &\quad 36.55 &\quad 36.05 &\quad 37.00 \\
    \text{Total} &\quad 100.00 &\quad 99.28 &\quad 100.00
\end{align*}
\]

(1) Punjab Salt Range, Pakistan; average of two analyses. (2) Hotson farm, South Africa; by XRF, H<sub>2</sub>O by the Penfield method. (3) Al<sub>12</sub>(SO<sub>4</sub>)<sub>5</sub>(OH)<sub>26</sub>•20H<sub>2</sub>O.

**Occurrence:** In veinlets in a kaolinite-böhmite rock (Punjab Salt Range, Pakistan); an alteration product of natroalunite or directly by hydrothermal sulfatization of sillimanite in massive sillimanite veins (Hotson farm, South Africa).

**Association:** Kaolinite, böhmite, aluminite (Punjab Salt Range, Pakistan); natroalunite, hotsonite (Hotson farm, South Africa).

**Distribution:** From the Punjab Salt Range, Pakistan. On the Hotson farm, 65 km west of Pofadder, Cape Province, South Africa.

**Name:** In honor of Mohammed Abduz Zaher (1935–), Geological Survey of Bangladesh, who discovered the mineral.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 143793.

**References:**


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