Zaherite $Al_{12}(SO_4)_5(OH)_{26}\cdot 20H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$ 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. $\alpha = 1.498(1)$ β = n.d. $\gamma = 1.499(1)$ 2V(meas.) = Moderate.

Cell Data: *Space Group:* $P\overline{1}$ or $P1$. $a = 18.475(0.942)$ $b = 19.454(0.591)$ $c = 3.771(0.231)$ $\alpha = 95°14.40'(1°6.60')$ $\beta = 91°21.80'(2°7.38')$ $\gamma = 80°14.40'(1°9.24')$ Z = 1

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:

	(1)	(2)	(3)
SO_3	24.87	24.63	24.92
P_2O_5	0.02	0.06	
CO_2	0.00		
SiO_2	0.63	0.11	
Al_2O_3	37.79	37.85	38.08
Fe_2O_3		0.08	
MnO		0.01	
MgO	0.01	0.19	
CaO	0.09	0.21	
Na_2O	0.03	0.08	
K_2O	0.01	0.01	
H_2O	36.55	36.05	37.00
Total	100.00	99.28	100.00

(1) Punjab Salt Range, Pakistan; average of two analyses. (2) Hotson farm, South Africa; by XRF, H_2O by the Penfield method. (3) $Al_{12}(SO_4)_5(OH)_{26}\cdot 20H_2O$.

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: (1) Ruotsala, A.P. and L.L. Babcock (1977) Zaherite, a new hydrated aluminum sulfate. Amer. Mineral., 62, 1125–1128. (2) Beukes, G.J., A.E. Schoch, H. de Bruiyn, W.A. van der Westhuizen, and L.D.C. Bok (1984) A new occurrence of the hydrated aluminium sulphate zaherite, from Pofadder, South Africa. Mineral. Mag., 48, 131–135. (3) de Bruiyn, H., A.E. Schoch, G.J. Beukes, L.D.C. Bok, and W.A. van der Westhuizen (1985) Note on cell parameters of zaherite. Mineral. Mag., 49, 145–146. (4) Schoch, A.E., G.J. Beukes, and H.E. Praekelt (1985) A natroalunite-zaherite-hotsonite paragenesis from Pofadder, Bushmanland, South Africa. Can. Mineral., 23, 29–34.