Bayerite $Al(OH)_3$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As very fine fibers; also as flaky and tabular crystals, to 0.1 mm; in radiating hemispherical aggregates and crusts.

Physical Properties: Hardness = n.d. D(meas.) = 2.53 D(calc.) = 2.54

Optical Properties: Semitransparent. *Color:* White.
Optical Class: Biaxial (+). *Orientation:* Extinction negative, parallel to fiber length.
α = 1.565–1.574 β = n.d. γ = 1.580–1.584 2V(meas.) = Small.

Cell Data: *Space Group:* $P2_1/a$; $P2_1/n$ (synthetic). $a = 5.0626(2)$ $b = 8.6719(2)$ $c = 9.4254(3)$ $\beta = 90.26(1)^\circ$ Z = 8

X-ray Powder Pattern: Hatrurim Formation, Israel.
4.73 (s), 2.21 (s), 4.36 (ms), 1.720 (m), 3.19 (w), 2.70 (vw), 2.16 (vw)

Chemistry: No chemical analysis appears to have been published.

Polymorphism & Series: Polymorphous with doyleite, gibbsite, and nordstrandite.

Occurrence: Probably precipitated from high-aluminum gels on carbonates at pH > 5.8 (Hatrurim Formation, Israel); as weathered crusts on amphiboles and pyroxenes (Dnieper region, Russia); in bauxites.

Association: Calcite, gypsum, portlandite, ettringite, vaterite, thaumasite (Hatrurim Formation, Israel).

Distribution: In the Hatrurim Formation, Israel. From an undefined area in the Dnieper region, and in the Listvennoye deposit, Yenisei Ridge, Siberia, Russia. In the San Elias mine, San Luis Province, Argentina. On Raoul Island, Kermadec Group, South Pacific.

Name: The artificial compound is thought to have been named for the 19th-century German metallurgist Karl J. Bayer; the name was then applied to the natural mineral.

Type Material: n.d.

References: (1) Gross, S. and L. Heller (1963) A natural occurrence of bayerite. Mineral. Mag., 33, 723–724. (2) (1964) Amer. Mineral., 49, 819 (abs. ref. 1). (3) Gross, S. (1977) The mineralogy of the Hatrurim Formation, Israel. Geol. Sur. Israel Bull. 70, 14–15. (4) Khorosheva, D.P. (1968) Bayerite from the bauxite horizon of the middle Dnieper region. Doklady Acad. Nauk SSSR, 182, 123–126 (in Russian). (5) Schoen, R. and C.E. Roberson (1970) Structures of aluminum hydroxide and geochemical implications. Amer. Mineral., 55, 43–77. (6) McHardy, W.J. and A.P. Thomson (1971) Conditions for the formation of bayerite and gibbsite. Mineral. Mag., 38, 358–368. (7) Zigan, F., W. Joswig, and N. Burger (1978) Die Wasserstoffpositionen im Bayerit, $Al(OH)_3$. Zeits. Krist., 148, 255–273 (in German with English abs.).