

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. As very finely fibrous crystals, to 0.1 mm, typically in spherulitic aggregates.

Physical Properties: Hardness = n.d. $D(\text{meas.}) = 2.54$ $D(\text{calc.}) = 2.65$

Optical Properties: Semitransparent. *Color:* Colorless.
Optical Class: Uniaxial (+). $\omega = 1.550$ $\epsilon = 1.644\text{--}1.650$

Cell Data: *Space Group:* $P6_3/mmc$. $a = 7.135$ $c = 8.524$ $Z = 6$

X-ray Powder Pattern: Synthetic.
3.30 (100), 2.73 (95), 1.823 (70), 2.065 (60), 3.57 (55), 1.858 (25), 1.647 (25)

Chemistry: (1) Identification depends on correspondence of the X-ray powder pattern with that of synthetic material.

Polymorphism & Series: Trimorphous with aragonite and calcite; metastable below ~ 400 °C.

Occurrence: A major constituent of a carbonated calcium silicate hydrogel complex formed from larnite (Ballycraigy, Ireland); a rock-forming mineral formed at low temperatures by hydration of metamorphic calc-silicate rocks in the presence of atmospheric CO₂, in slightly metamorphosed marls and conglomerates, and in weathering crusts (Hatrurim Formation, Israel).

Association: Calcite, aragonite, tobermorite, hydrogarnet, kaolinite (Hatrurim Formation, Israel).

Distribution: From Ballycraigy, Larne, Co. Antrim, Ireland. At the Bellerberg and Emmelberg volcanoes, Eifel district, Germany. From Hopffeldboden, Salzburg, Austria. At Mont Saint-Hilaire, Quebec, Canada. From the Wessels mine, near Kuruman, Cape Province, South Africa. In the Hatrurim Formation, Israel. At Liawenee, near Great Lake, Tasmania, Australia. From the McMurdo area, Antarctica.

Name: To honor Heinrich Vater (1859–1930), Professor of Mineralogy and Chemistry, Tharandt, Germany.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 181–182 [hypothetical mineral]. (2) McConnell, J.D.C. (1960) Vaterite from Ballycraigy, Larne, Northern Ireland. *Mineral. Mag.*, 32, 535–545. (3) Gross, S. (1977) The mineralogy of the Hatrurim Formation, Israel. *Geol. Sur. Israel Bull.* 70, 21–23. (4) Sato, M. and S. Matsuda (1969) Structure of vaterite and infrared spectra. *Zeits. Krist.*, 129, 405–410. (5) Meyer, H.J. (1969) Struktur und Fehlordnung des Vaterits. *Zeits. Krist.*, 128, 183–212 (in German with English abs.).