Herderite $CaBe(PO_4)F$

Crystal Data: [Monoclinic, pseudo-orthorhombic] (by analogy to hydroxylherderite). *Point Group:* $2/m$. Crystalline.

Physical Properties: Hardness = 5–5.5 D(meas.) = 3.02 D(calc.) = n.d. Fluoresces violet under UV; cathodoluminesces and phosphoresces pinkish orange under X-rays.

Optical Properties: Transparent. *Color:* Light green; colorless in transmitted light.
Luster: Vitreous.
Optical Class: Biaxial (–). *Orientation:* r > v, moderate. α = 1.556–1.59 β = 1.578–1.61 γ = 1.589–1.62 2V(meas.) = n.d. 2V(calc.) = 70°

Cell Data: *Space Group:* n.d. Z = n.d.

X-ray Powder Pattern: Cannot be distinguished from hydroxylherderite; similar to datolite.

Chemistry: (1) Electron microprobe analysis of a gemstone from "Brazil" shows F 7.0% (so with F> 5.86%, the series midpoint).

Polymorphism & Series: Forms a series with hydroxylherderite.

Occurrence: Probably from a complex granite pegmatite.

Association: n.d.

Distribution: Originally found in Germany, at Ehrenfriedersdorf, Saxony, but the analysis showing F > OH is suspect and any material from this locality seems unavailable. A gemstone from "Brazil" is the only known fluorine-dominant herderite proven by modern analytical methods.

Name: To honor Siegmund August Wolfgang von Herder (1776–1838), mining official, Freiberg, Saxony, Germany.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 820–822. (2) Dunn, P.J. and W. Wight (1976) Green gem herderite from Brazil. J. Gemmology, 15, 27–28. (3) Leavens, P.B., P.J. Dunn, and R.V. Gaines (1978) Compositional and refractive index variations of the herderite – hydroxyl-herderite series. Amer. Mineral., 63, 913–917.