

Crystal Data: Orthorhombic, pseudotetragonal by twinning. *Point Group:* $2/m\ 2/m\ 2/m$. Crystal plates, to 0.3 mm, showing {001}, {111}, {10•10}; in spherical aggregates. *Twinning:* At a very fine scale.

Physical Properties: Hardness = "Soft". $D(\text{meas.}) = 5.80$ $D(\text{calc.}) = [5.85]$

Optical Properties: Semitransparent. *Color:* Brown, brownish yellow, lemon-yellow. *Optical Class:* Biaxial or uniaxial. $n = > 2.05$ $\alpha = \text{n.d.}$ $\beta = \text{n.d.}$ $\gamma = \text{n.d.}$ $2V(\text{meas.}) = \text{n.d.}$

Cell Data: *Space Group:* $Pm\bar{m}n$. $a = 3.7976(2)$ $b = 3.7976(2)$ $c = 13.569(4)$ $Z = 2$

X-ray Powder Pattern: Krupka, Czech Republic. 2.89 (10), 1.732 (9), 1.589 (9), 1.893 (8), 1.200 (8), 2.104 (7), 1.278 (6)

Chemistry:	(1)	(2)
CO ₂	12.6	12.79
Bi ₂ O ₃	67.9	67.71
CaO	8.3	8.15
CaF ₂	10.6	11.35
H ₂ O	0.5	
Total	99.9	100.00

(1) Krupka, Czech Republic; by microchemical analysis. (2) CaBiO(CO₃)F.

Occurrence: In a quartz vein cutting pegmatitic potassian feldspar (Krupka, Czech Republic).

Association: Fluorite, bismuth, bismuthinite, hematite, topaz (Krupka, Czech Republic); perite, hemimorphite, embolite, fluorite, chrysocolla, quartz (Blue Bell claims, California, USA).

Distribution: From Krupka, Krušné hory Mountains, and at Jáchymov (Joachimsthal), Czech Republic. From Niederschlema and from the Waldschacht, near Schneeberg, Saxony, and in the Clara mine, near Oberwolfach, Black Forest, Germany. In the USA, from near Bowie, Cochise Co., Arizona; at the Apache mine, Hidalgo Co., New Mexico; from the Blue Bell claims, near Baker, San Bernardino Co., California. At Kudul, Tajikistan.

Name: Honoring Radim Kettner (1891–1968), Professor of Geology, Charles University, Czech Republic.

Type Material: National Museum, Prague, Czech Republic, 43298.

References: (1) Zak, L. and V. Syneček (1956) Kettnerite. (CaF)(BiO)CO₃, a new mineral of the phosgenite-bismutite group: preliminary note. *Časopis mineral. geol.*, 1(3), 195–197 (in Czech with English abs.). (2) (1957) *Amer. Mineral.*, 42, 121 (abs. ref. 1). (3) Zak, L. and V. Syneček (1957) Bismuth minerals from Krupka (Graupen) in the Krušné hory (Erzgebirge). *Univ. Carolina, Geol.* 3(1), 1–46 (in Czech with English summary). (4) (1958) *Amer. Mineral.*, 43, 121 (abs. ref. 3). (5) Grice, J.D., M.A. Cooper, and F.C. Hawthorne (1999) Crystal-structure determination of twinned kettnerite. *Can. Mineral.*, 37, 923–927.