

Kruijenite**Ca₄Al₄(SO₄)F₂(OH)₁₆·2H₂O**

Crystal Data: Tetragonal. *Point Group:* 4/m 2/m 2/m. As prismatic tetragonal crystals to 1 mm, in radiating or random clusters to 2 mm, as well as in dense aggregates intergrown with calcite.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* n.d. Hardness = 3
D(meas.) = n.d. D(calc.) = 2.573

Optical Properties: Transparent to translucent. *Color:* Pale greenish yellow to colorless.
Streak: n.d. *Luster:* Vitreous.
Optical Class: Uniaxial (-). $\omega = 1.576(3)$ $\varepsilon = 1.561(3)$ Non-pleochroic.

Cell Data: *Space Group:* P4/ncc. $a = 12.9299(4)$ $c = 5.2791(3)$ $Z = 2$

X-ray Powder Pattern: Feuerberg quarry, near Daun, Eifel region, Rhineland-Palatinate, Germany.
4.565 (100), 9.12 (77), 2.964 (74), 4.084 (50), 1.971 (40), 2.284 (29), 2.694 (27)

Chemistry:	(1)
CaO	32.38
Al ₂ O ₃	27.75
Cr ₂ O ₃	1.45
SO ₃	8.09
F	5.84
H ₂ O	[25.64]
- O = F ₂	2.46
Total	98.69

(1) Feuerberg quarry, near Daun, Eifel region, Rhineland-Palatinate, Germany; average of 18 electron microprobe analyses supplemented by IR spectroscopy, H₂O calculated from structure; corresponds to Ca_{4.00}(Al_{3.77}Cr_{0.13})_{Σ=3.90}(SO₄)_{0.70}F_{2.13}(OH)_{16.17}·1.79H₂O.

Occurrence: In fragments of altered calcic xenolith from tephra, the product of pyrometamorphic and hydrothermal alteration by magmatic volatiles.

Association: Fluorite, calcite, aragonite, cuspidine, magnesioferrite, hematite, sharyginite, harmunite.

Distribution: At the Feuerberg quarry, 7 km north of Daun, Hinterweiler municipality, Eifel paleovolcanic region, Rhineland-Palatinate, Germany.

Name: Honors Dutch collector of Eifel minerals Fred *Kruijen* (b. 1956), an author of numerous articles in popular scientific periodicals and an outstanding photographer of Eifel micro-minerals.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (5233/1).

References: (1) Chukanov, N.V., N.V. Zubkova, G. Blass, I.V. Pekov, D.A. Varlamov, D.I. Belakovskiy, D.A. Ksenofontov, S.N. Britvin, and D.Y. Pushcharovky (2019) Kruijenite, Ca₄Al₄(SO₄)F₂(OH)₁₆·2H₂O, a new mineral with microporous structure from the Eifel paleovolcanic region, Germany. *Mineralogy and Petrology*, 113(2), 229-236. (2) (2021) *Amer. Mineral.*, 106, 162 (abs. ref. 1).