

Crystal Data: Monoclinic. *Point Group:* 2/m. As radiating aggregates, to 3 cm, of platy (001) crystals, as acicular to prismatic crystals <1 mm, and as pseudo-rhombohedral crystals showing {001}, {111}, {332}, and {331}. Epitaxial intergrowths with brackebuschite are common, with parallel alignment of the *b* axes of both minerals. *Twinning:* Polysynthetic on (001), common.

Physical Properties: *Cleavage:* Perfect || (001), another distinct set intersecting (001) at a high angle visible in polished section. *Tenacity:* n.d. *Fracture:* n.d. *Hardness* = 4.5 *D*(meas.) = > 4.04 *D*(calc.) = 4.51-4.81

Optical Properties: Opaque, transparent as thin plates. *Color:* Brown to black with red internal reflections, reddish brown in transmitted light. *Streak:* Brown. *Luster:* Adamantine. *Optical Class:* Biaxial. *n*(calc.) = 2.21(1) for *R*₁ and 2.39(3) for *R*₂. *Pleochroism* (plane polarized light): Distinct, orange. *Pleochroism* (reflected light): Slight, very light gray to light brownish gray. *Anisotropism:* Strong, dark metallic blue, lighter blue-gray, silver, to light purplish brown-gray. *R*₁-*R*₂: (400) 17.2-20.9, (420) 16.8-20.5, (440) 16.5-20.0, (460) 16.1-19.5, (470) 15.8-19.2, (480) 15.7-18.9, (500) 15.4-18.6, (520) 15.2-18.3, (546) 14.8-17.8, (560) 14.7-17.7, (580) 14.5-17.4, (590) 14.4-17.3, (600) 14.4-17.2, (620) 14.3-17.0, (640) 14.1-16.9, (650) 14.1-16.8, (660) 14.0-16.6, (680) 14.1-16.5, (700) 13.8-16.3

Cell Data: *Space Group:* C2/m. *a* = 9.275(7) *b* = 6.284(3) *c* = 7.682(2) β = 117.97(4)° *Z* = 2

X-ray Powder Pattern: Krettnich, Saarland, Germany.

3.270 (100), 3.388 (95), 2.4910 (93), 1.6970 (83), 2.946 (51), 2.850 (49), 1.8693 (35)

Chemistry:	(1)	(2)	(1)	(2)
CaO	0.60		Al ₂ O ₃	0.04
BaO	0.90		Fe ₂ O ₃	1.25
SrO	1.48		Mn ₂ O ₃	24.03
PbO	32.66	38.42	As ₂ O ₅	2.92
CuO	0.42		V ₂ O ₅	29.26
CoO	2.22		H ₂ O	[3.54]
NiO	0.04		Total	99.36
				100.00

(1) Krettnich, Saarland, Germany; average of 54 electron microprobe analyses, H₂O calculated; corresponds to (Pb_{0.83}Sr_{0.08}Ca_{0.06}Ba_{0.03}) $\Sigma=1.00$ (Mn³⁺_{0.73}Co_{0.17}Fe_{0.09}Cu_{0.03}Al_{0.01}) $\Sigma=2.03$ (V_{1.83}As_{0.14}) $\Sigma=1.97$ O_{7.71}(OH)_{2.23}. (2) $\text{PbMn}^{3+}_2(\text{VO}_4)_2(\text{OH})_2$.

Mineral Group: Member of the tsumcorite group.

Occurrence: As a primary accessory ore mineral and as free crystals in vugs within a non-metamorphosed, hydrothermal manganite-quartz vein.

Association: Barite, ankerite, manganite, mottramite, brackebuschite, pyrobelonite.

Distribution: From the historic manganese deposit near Krettnich, Saarland, Germany.

Name: For the locality that provided the first specimens, Krettnich, Germany.

Type Material: Musée Cantonal de Géologie, Lausanne, Switzerland (MGL 65317), and the Natural History Museum, London, England.

References: (1) Brugger, J., T. Armbruster, A. Criddle, P. Berlepsch, S. Graeser and S. Reeves (2001) Description, crystal structure, and paragenesis of krettnichite, $\text{PbMn}^{3+}_2(\text{VO}_4)_2(\text{OH})_2$, the Mn³⁺ analogue of mounanaite. *Eur. J. Mineral.*, 13(1), 145-158. (2) (2001) *Amer. Mineral.*, 86 (11-12) 1535 (abs. ref. 1).