

Crystal Data: Hexagonal. *Point Group:* $\bar{3} 2/m$. As lamellar crystals to 0.05 mm, coarsely hexagonal or irregular and typically curved; in rose-like clusters or globular aggregates to 0.2 mm.

Physical Properties: *Cleavage:* Perfect on {0001}. *Fracture:* Laminated. *Tenacity:* Brittle. Hardness = ~ 3 D(meas.) = n.d. D(calc.) = 3.415 Dissolves in dilute HCl.

Optical Properties: Transparent. *Color:* Orange; reddish brown in transmitted light. *Streak:* Pale yellow-orange. *Luster:* Vitreous. *Optical Class:* Uniaxial (+). $\omega = 1.827(8)$ $\epsilon = 1.843(8)$

Cell Data: *Space Group:* $P\bar{3} m1$ (by analogy with martyite). $a = 6.016(4)$ $c = 7.234(6)$ $Z = 1$

X-ray Powder Pattern: Little Eva mine, Grand County, Utah, USA. 7.15 (100), 2.95 (54), 2.60 (36), 2.44 (33), 4.20 (25), 3.59 (21), 2.77 (21)

Chemistry:	(1)
MgO	0.05
CaO	0.26
MnO	1.39
CoO	33.22
NiO	2.02
CuO	0.28
ZnO	12.66
V ₂ O ₅	38.70
<u>H₂O</u>	<u>[11.61]</u>
Total	100.19

(1) Little Eva mine, Grand County, Utah, USA; average of 12 electron microprobe analyses supplemented by Raman spectroscopy, H₂O calculated from stoichiometry; corresponds to (Co_{2.06}Zn_{0.72}Ni_{0.13}Mn_{0.09}Ca_{0.02}Cu_{0.02}Mg_{0.01})_{Σ=3.05}V_{1.98}O₇(OH)₂·2H₂O.

Polymorphism & Series: Forms a nearly continuous series with martyite. The Co-richest and Zn-poorest composition found was (Co_{2.80}Zn_{0.09}Ni_{0.07}Ca_{0.05}Mn_{0.02}Cu_{0.02})_{Σ=3.05}V_{1.98}O₇(OH)₂·2H₂O; the Co-poorest and Zn-richest composition was (Co_{1.46}Zn_{1.15}Mn_{0.21}Ni_{0.20})_{Σ=3.02}V_{1.99}O₇(OH)₂·2H₂O.

Occurrence: A secondary mineral formed during the post-mining oxidation of corvusite and montroseite in a moist environment at ambient temperatures.

Association: Martyite, quartz, gypsum, barite, roscoelite.

Distribution: From the Little Eva mine, Yellow Cat District, Grand County, Utah, USA.

Name: Honors Russian mineralogist Vladimir Yu. Karpenko (b. 1965), an expert on the mineralogy of vanadium.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4605/1).

References: (1) Kasatkin, A.V., J. Plášil, I.V. Pekov, D.I. Belakovskiy, F. Nestola, J. Čejka, M.F. Vígassina, F. Zorzi, and B. Thorne (2015) Karpenkoite, Co₃(V₂O₇)(OH)₂·2H₂O, a cobalt analogue of martyite from the Little Eva mine, Grand County, Utah, USA. *J. Geosciences*, 60(4), 251-257. (2) (2017) *Amer. Mineral.*, 102, 1963-1964 (abs. ref. 1).