

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . As thin plates and flakes with prominent {001}, to 1mm; in mats or rosette-like clusters.

**Physical Properties:** *Cleavage:* Perfect on {001}, good on {110}. *Fracture:* Curved.  
*Tenacity:* Brittle; thin flakes slightly flexible. Hardness = 3 D(meas.) = 3.37(3) D(calc.) = 3.375

**Optical Properties:** Transparent. *Color:* Bright yellow-orange to red-orange. *Streak:* Pale yellow-orange. *Luster:* Adamantine.

*Optical Class:* Uniaxial (+).  $\omega = 1.797(3)$   $\epsilon = 1.806(3)$

*Pleochroism:* *O* = Red-orange; *E* = yellow.

**Cell Data:** *Space Group:*  $P\bar{3} m1$ .  $a = 6.0818(4)$   $c = 7.1793(10)$   $Z = 1$

**X-ray Powder Pattern:** Blue Cap mine, San Juan County, Utah, USA.

7.211 (100), 2.968 (50), 2.470 (40), 2.628 (35), 1.485 (25), 4.252 (20), 2.796 (20)

**Chemistry:**

	(1)	(2)
ZnO	46.93	50.85
CoO	2.39	
CaO	0.58	
MgO	0.03	
V <sub>2</sub> O <sub>5</sub>	39.47	37.89
H <sub>2</sub> O	12.06	11.26
Total	101.46	100.00

(1) Blue Cap mine, San Juan County, Utah, USA; average of 4 electron microprobe analyses, H<sub>2</sub>O calculated from structure, corresponding to  $(\text{Zn}_{2.66}\text{Co}_{0.15}\text{Ca}_{0.05})_{\Sigma=2.86}(\text{V}_2\text{O}_7)(\text{OH})_{1.72} \cdot 2.23\text{H}_2\text{O}$ .

(2)  $\text{Zn}_3(\text{V}_2\text{O}_7)(\text{OH})_2 \cdot 2\text{H}_2\text{O}$ .

**Occurrence:** Product of groundwater leaching and oxidation of vanadium oxides in a post-mining environment.

**Association:** Gypsum, rossite, pyrite, montroseite, magnesiopascoite.

**Distribution:** Blue Cap mine, near La Sal, San Juan County, Utah, USA.

**Name:** Honors Joe Marty (b. 1945) for his contributions to mineralogy.

**Type Material:** Natural History Museum of Los Angeles County, California, USA, 58610 and 58611.

**References:** (1) Kampf A.R., and I.M. Steele (2008) Martyite, a new mineral species related to volborthite: description and crystal structure. *Can. Mineral.*, 46, 687–692. (2) (2009) *Amer. Mineral.*, 94, 401 (abs. ref. 1).