## Martyite $Zn_3(V_2O_7)(OH)_2 \cdot 2H_2O$

**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) $\varepsilon$ = 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 | |
| $V_2O_5$ | 39.47 | 37.89 |
| $H_2O$ | 12.06 | 11.26 |
| Total | 101.46 | 100.00 |

(1) Blue Cap mine, San Juan County, Utah, USA; average of 4 electron microprobe analyses, $H_2O$ calculated from structure, corresponding to $(Zn_{2.66}Co_{0.15}Ca_{0.05})_{\Sigma=2.86}(V_2O_7)(OH)_{1.72}\cdot 2.23H_2O$.
(2) $Zn_3(V_2O_7)(OH)_2 \cdot 2H_2O$.

**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).