

**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . As platy, spear-shaped or blocky crystals, to 2 mm.

**Physical Properties:** *Cleavage:* Perfect on (001). *Fracture:* n.d. *Tenacity:* Brittle.  
 Hardness = 1 (estimated) D(meas.) = n.d. D(calc.) = 2.29  
 Highly soluble in water, acetone and alcohol; dehydrates under conditions of low humidity.

**Optical Properties:** Transparent to translucent. *Color:* Orange to golden orange. *Streak:* Yellow.  
*Luster:* Subadamantine.  
*Optical Class:* Biaxial (-).  $\alpha = 1.698(5)$   $\beta = 1.740(5)$   $\gamma = 1.770(5)$   $2V(\text{meas.}) = 84(2)^\circ$   
*Dispersion:* Strong,  $r > v$ . *Pleochroism:* X = Y = light golden yellow, Z = dark golden yellow.  
*Absorption:* X = Y < Z.

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 8.668(4)$   $b = 10.295(4)$   $c = 12.908(5)$   $\alpha = 105.826(9)^\circ$   
 $\beta = 97.899(9)^\circ$   $\gamma = 103.385(9)^\circ$   $Z = 1$

**X-ray Powder Pattern:** Sunday mine, San Miguel County, Colorado, USA.  
 12.24 (100), 8.246 (38), 9.408 (30), 8.994 (28), 2.724 (23), 3.354 (18), 7.561 (15)

| <b>Chemistry:</b>              | (1)      | (2)    |
|--------------------------------|----------|--------|
| Na <sub>2</sub> O              | 8.00     | 6.41   |
| Al <sub>2</sub> O <sub>3</sub> | 4.63     | 3.52   |
| V <sub>2</sub> O <sub>5</sub>  | 78.51    | 62.73  |
| H <sub>2</sub> O               | [8.86]   | 27.34  |
| Total                          | [100.00] | 100.00 |

(1) Sunday mine, San Miguel County, Colorado, USA; average of 4 electron microprobe analyses of partially dehydrated material, H<sub>2</sub>O by difference, corresponding to Na<sub>2.99</sub>Al<sub>1.05</sub>(V<sub>10</sub>O<sub>28</sub>)•5.70H<sub>2</sub>O.  
 (2) Na<sub>3</sub>Al(V<sub>10</sub>O<sub>28</sub>)•22H<sub>2</sub>O.

**Occurrence:** As efflorescent crusts on the sandstone walls of mine workings and in rock fractures, through the oxidation of primary vanadium oxides (corvusite and montroseite) that react with acidic, oxidizing groundwater in roll-front type U deposits, usually in organic-carbon-rich zones.

**Association:** Rossite, lasalite, hewettite, sherwoodite, corvusite, montroseite, rakovanite, gunterite.

**Distribution:** Sunday mine, Gypsum Valley, San Miguel County, Slick Rock District, Colorado, USA.

**Name:** Honors John Michael Hughes (b. 1952), Professor of Mineralogy, University of Vermont, USA, for his long and outstanding career in mineralogy, including his extensive work on the pascoite family of minerals and vanadium bronzes.

**Type Material:** National Museum of Natural History, Washington D.C., USA, (NMNH 174253).

**References:** (1) Rakovan, J., G.R. Schmidt, M.E. Gunter, B. Nash, J. Marty, A.R. Kampf, and W.S. Wise (2011) Hughesite, Na<sub>3</sub>Al(V<sub>10</sub>O<sub>28</sub>)•22H<sub>2</sub>O, a new member of the pascoite family of minerals from the Sunday Mine, San Miguel County, Colorado. *Canadian Mineralogist*, 49, 1253-1265.  
 (2) (2014) *Amer. Mineral.*, 99, 870-871 (abs. ref. 1).