

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. Crystals display {100}, {001}, $\{1\bar{1}0\}$, $\{1\bar{1}\bar{1}\}$, $\{01\bar{2}\}$ and {111}, are flattened on {001}, or form stout prisms, elongated along [110], to ~ 0.5 mm.

Twinning: Cross-hatched twins in transmitted light and crossed polars.

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = 2 D(meas.) = n.d. D(calc.) = 2.167 Soluble in water.

Optical Properties: Transparent. *Color:* Yellow to orange-brown. *Streak:* Tan. *Luster:* Vitreous.

Optical Class: Biaxial (–). $\alpha = 1.576(1)$ $\beta = 1.585(1)$ $\gamma = 1.591(1)$

$2V(\text{meas.}) = 80(1)^\circ$ $2V(\text{calc.}) = 78^\circ$ *Dispersion:* Strong; $r > v$. *Orientation:* $X \approx \perp \{001\}$; $Z \approx [110]$. *Pleochroism:* $X = \text{yellow}$; $Y = Z = \text{orange}$. *Absorption:* $X < Y \approx Z$.

Cell Data: Space Group: $P\bar{1}$. $a = 9.5927(2)$ $b = 9.7679(3)$ $c = 18.3995(13)$ $\alpha = 93.250(7)^\circ$ $\beta = 95.258(7)^\circ$ $\gamma = 117.993(8)^\circ$ $Z = 2$

X-ray Powder Pattern: Huron River burn site, Ohio, USA.

9.23 (100), 7.57 (43), 3.144 (41), 8.26 (40), 4.93 (23), 3.328 (20), 3.035 (16)

Chemistry:	(1)	(2)	(3)
$(\text{NH}_4)_2\text{O}$	[12.75]	12.30	13.34
Na_2O	0.79	0.76	
K_2O	0.59	0.57	
Fe_2O_3	25.70	24.79	24.54
SO_3	50.67	48.88	49.21
H_2O	[13.16]	12.70	12.92
Total	103.66	100.00	100.00

(1) Huron River burn site, Ohio, USA; average of 7 electron microprobe analyses supplemented by Raman and IR spectroscopy, $(\text{NH}_4)_2\text{O}$ and H_2O calculated from structure analysis. (2) Analysis (1) normalized; corresponding to $[(\text{NH}_4)_{4.64}\text{Na}_{0.24}\text{K}_{0.12}]_{\Sigma=5.00}\text{Fe}^{3+}_{3.05}\text{O}(\text{SO}_4)_6 \cdot 6.93\text{H}_2\text{O}$.

(3) $(\text{NH}_4)_5\text{Fe}^{3+}_3\text{O}(\text{SO}_4)_6 \cdot 7\text{H}_2\text{O}$.

Occurrence: Formed by a natural fire in oil-bearing shale exposed along a cliff.

Association: Anhydrite, boussingaultite, gypsum, loncreekite.

Distribution: From a cliff (the Huron River burn site 2009–2011) along the Huron River, ~ 6.1 km WSW of Milan, Ohio, USA.

Name: Honors Ernest H. Carlson (1933–2010), Professor of Mineralogy, Kent State University, Ohio, USA and author of Ohio Geological Survey Bulletin 69, *Minerals of Ohio* (1991).

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (65544 and 65545).

References: (1) Kampf, A.R., R.P. Richards, B.P. Nash, J.B. Murowchick, and J.F. Rakovan (2016) Carlsonite, $(\text{NH}_4)_5\text{Fe}^{3+}_3\text{O}(\text{SO}_4)_6 \cdot 7\text{H}_2\text{O}$, and huizingite-(Al), $(\text{NH}_4)_9\text{Al}_3(\text{SO}_4)_8(\text{OH})_2 \cdot 4\text{H}_2\text{O}$, two new minerals from a natural fire in an oil-bearing shale near Milan, Ohio. *Amer. Mineral.*, 101, 2095–2107.