

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$  or  $m$ . As lathlike to platy grains, to 20  $\mu\text{m}$ , in microcrystalline aggregates, in seams and crusts.

**Physical Properties:** Hardness = Soft.  $D(\text{meas.}) = 2.70$   $D(\text{calc.}) = 2.68$  Radioactive.

**Optical Properties:** Semitransparent. *Color:* Pale creamy yellow.

*Optical Class:* Biaxial (-). *Pleochroism:*  $X = \text{colorless}$ ;  $Y = Z = \text{pale yellow}$ . *Orientation:*  $Y = \text{elongation of laths with positive elongation}$ ;  $Y \wedge 8^\circ\text{--}25^\circ$  to elongation of laths with negative elongation.  $\alpha = 1.550(5)$   $\beta = 1.586(5)$   $\gamma = 1.590(5)$   $2V(\text{meas.}) = 28^\circ\text{--}43^\circ$ , average  $40^\circ$ .

**Cell Data:** *Space Group:*  $C2/c$  or  $Cc$ .  $a = 12.50(3)$   $b = 12.97(3)$   $c = 23.00(3)$   
 $\beta = 106.6^\circ$   $Z = 4$

**X-ray Powder Pattern:** Jomac mine, Utah, USA.

11.12 (100), 5.56 (42), 3.30 (22), 5.64 (18), 4.59 (14), 3.71 (12), 4.31 (10)

**Chemistry:**

	(1)	(2)	(3)
$\text{UO}_3$	34.2	34.9	36.30
$\text{SO}_3$	6.1	5.4	5.08
$\text{P}_2\text{O}_5$	17.7	18.3	18.01
$\text{CO}_2$	0.7	< 0.1	
$\text{Al}_2\text{O}_3$	6.5	6.6	6.47
$\text{Fe}_2\text{O}_3$	10.3	9.7	10.13
$\text{CaO}$	< 0.1	0.1	
$\text{Na}_2\text{O}$	0.1	< 0.1	
$\text{H}_2\text{O}^+$	23.4	24.0	24.01
insol.	1.0	0.5	
Total	100.0	99.5	100.00

(1) Jomac mine, Utah, USA; by spectrophotometry, Ca and Na by flame photometry,  $\text{SO}_3$  by gravimetry,  $\text{CO}_2$  and  $\text{H}_2\text{O}$  by CHN analyzer; after deduction of  $\text{H}_2\text{O}^-$  18.8%, then corresponding to  $\text{Fe}_{2.16}^{3+}\text{Al}_{2.12}(\text{UO}_2)_2(\text{PO}_4)_{4.16}(\text{SO}_4)_{1.28}(\text{OH})_2 \cdot 19.72\text{H}_2\text{O}$ . (2) Blackwater No. 4 mine, Arizona, USA; analytical methods as for (1); after deduction of  $\text{H}_2\text{O}^-$  18.2%, then corresponding to  $\text{Fe}_{2.0}^{3+}\text{Al}_{2.00}(\text{UO}_2)_2(\text{PO}_4)_{4.24}(\text{SO}_4)_{1.10}(\text{OH})_2 \cdot 19.84\text{H}_2\text{O}$ . (3)  $\text{Fe}_2\text{Al}_2(\text{UO}_2)_2(\text{PO}_4)_4(\text{SO}_4)(\text{OH})_2 \cdot 20\text{H}_2\text{O}$ .

**Occurrence:** In the oxidized zone of vanadium-poor Colorado Plateau-type U-V deposits (Utah and Arizona, USA).

**Association:** Gypsum, jarosite, "limonite", quartz, clay minerals, coalized wood (Jomac mine, Utah, USA).

**Distribution:** In the USA, from the Jomac mine, White Canyon district, San Juan Co., Utah; in the Sun Valley mine and Huskon No. 7 mine, near Cameron, Coconino Co., and the Blackwater No. 4 mine, Apache Co., Arizona; at the Ruggles mine, Grafton, Grafton Co., New Hampshire; from an unspecified locality in Wyoming. From an unspecified locality in the Kyzylkum region, Uzbekistan.

**Name:** For Coconino Co., Arizona, USA, from which samples were obtained.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 119772.

**References:** (1) Young, E.J., A.D. Weeks, and R. Meyrowitz (1966) Coconinoite, a new uranium mineral from Utah and Arizona. *Amer. Mineral.*, 51, 651-663. (2) (1993) Belova, L.N., A.I. Gorshkov, O.A. Doinikova, A.V. Mokhov, N.V. Trubkin, and A.V. Sivtsov (1993) New data on coconinoite. *Doklady Acad. Nauk SSSR*, 329, 772-775 (in Russian).