

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As prisms elongated along $[11\bar{1}]$ to several mm and in subparallel or irregular aggregates. Crystals display $\{100\}$, $\{010\}$, $\{001\}$, $\{101\}$, $\{011\}$, $\{110\}$ and $\{10\bar{1}\}$.

Physical Properties: *Cleavage:* Good on $\{1\bar{1}0\}$, $\{011\}$ and $\{101\}$. *Fracture:* Irregular. *Tenacity:* Slightly sectile. Hardness = 2.5 D(meas.) = n.d. D(calc.) = 3.360 Slightly deliquescent and easily soluble in H_2O . Bright greenish white fluorescence under UV.

Optical Properties: Transparent. *Color:* Pale greenish yellow. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (+). $\alpha = 1.537(1)$ $\beta = 1.555(1)$ $\gamma = 1.594(1)$ $2V(\text{meas.}) = 72(2)^\circ$ $2V(\text{calc.}) = 70^\circ$ *Dispersion:* Moderate, $r > v$, inclined. *Pleochroism:* X = very pale greenish yellow, Y = pale greenish yellow, Z = greenish yellow. *Absorption:* $X < Y < Z$.

Orientation: $X \approx \perp \{101\}$, $Z \approx [11\bar{1}]$.

Cell Data: *Space Group:* $P\bar{1}$. $a = 7.9576(6)$ $b = 8.1952(6)$ $c = 9.8051(7)$ $\alpha = 65.967(5)^\circ$ $\beta = 70.281(5)^\circ$ $\gamma = 84.516(6)^\circ$ $Z = 2$

X-ray Powder Pattern: Blue Lizard mine, White Canyon district, San Juan County, Utah, USA. 7.01 (100), 3.476 (85), 3.131 (57), 3.336 (55), 6.00 (49), 7.71 (43), 4.70 (42)

Chemistry:	(1)	(2)
Na ₂ O	10.94	11.03
UO ₃	50.77	50.80
SO ₃	29.75	28.55
<u>H₂O</u>	<u>[9.85]</u>	<u>9.62</u>
Total	101.31	100.00

(1) Blue Lizard mine, White Canyon district, San Juan County, Utah, USA; average of 6 electron microprobe analyses supplemented by Raman spectroscopy, H₂O calculated from stoichiometry; corresponding to Na_{1.94}(U_{0.97}O₂)(S_{1.02}O₄)₂(H₂O)₃. (2) Na₂(UO₂)(SO₄)₂·3H₂O.

Occurrence: A secondary mineral from post-mining oxidation of primary uraninite, pyrite, chalcopyrite, bornite, and covellite deposited as replacement of wood and other organic material and as disseminations in the enclosing sandstone.

Association: Ferriite, blödite, bluelizardite, chalcantite, epsomite, gypsum, hexahydrate, kröhnkite, manganoblödite, sideronatriite, tamarugite, wetherillite.

Distribution: From the Blue Lizard mine, Red Canyon, White Canyon district, San Juan County, Utah, USA.

Name: Honors American physicist Dr. J. Robert Oppenheimer (1904-1967), former Professor of Physics concurrently at the University of California, Berkeley and the California Institute of Technology, USA. Well known for his work for the Manhattan Project during World War II, he became an outspoken critic of the development of the hydrogen bomb.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (65549-65551), and the A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94622).

References: (1) Kampf, A.R., J. Plašil, A.V. Kasatkin, J. Marty and J. Čejka (2015) Ferriite, Na₄(UO₂)(SO₄)₃·3H₂O and oppenheimerite, Na₂(UO₂)(SO₄)₂·3H₂O, two new uranyl sulfate minerals from the Blue Lizard mine, San Juan County, Utah, USA. *Mineral. Mag.*, 79(5), 1123-1142. (2) (2016) *Amer. Mineral.*, 101, 1017 (abs. ref. 1).