

Crystal Data: Triclinic. *Point Group:* 1 or $\bar{1}$. As plates, to 3 mm, flattened on {010}.
Twinning: Polysynthetic on {010}, universal.

Physical Properties: *Cleavage:* Perfect micaceous {010}; {100}, {001}, {101}, {10 $\bar{1}$ }, good.
Fracture: Irregular. *Tenacity:* Flexible. Hardness = ~2 D(meas.) = n.d. D(calc.) = 6.37
 Slightly soluble in H₂O.

Optical Properties: Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Vitreous to pearly.

Optical Class: Biaxial (-). *Orientation:* Euler angles $\phi = 67^\circ$; $\psi = 60^\circ$; $\theta = 76^\circ$.

Dispersion: $r < v$, strong. $\alpha = 1.678(2)$ $\beta = 1.690(2)$ $\gamma = 1.694(2)$ $2V(\text{meas.}) = 70(3)^\circ$
 $2V(\text{calc.}) = 66^\circ$

Cell Data: *Space Group:* $P1$ or $P\bar{1}$. $a = 5.842(2)$ $b = 25.20(5)$ $c = 5.652(2)$
 $\alpha = 93.84(4)^\circ$ $\beta = 90.14(4)^\circ$ $\gamma = 85.28(4)^\circ$ $Z = 4$

X-ray Powder Pattern: Grand Reef mine, Arizona, USA.
 3.134 (100), 12.5 (80), 3.65 (70), 3.50 (60), 3.33 (60), 2.916 (40), 2.822 (40)

Chemistry:	(1)	(2)
Pb	73.8	74.22
Al	3.6	3.22
F	21.0	20.41
H ₂ O	[3.0]	2.15
Total	[101.4]	100.00

(1) Grand Reef mine, Arizona, USA; by electron microprobe, H₂O estimated from IR; corresponds to Pb_{2.90}Al_{1.09}F₉•1.36H₂O. (2) Pb₃AlF₉•H₂O.

Occurrence: In the oxidized zone of an epithermal Pb–Cu–Ag deposit hosted by a silicified rhyolite-schist breccia.

Association: Grandreefite, pseudograndreefite, laurelite, fluorite, galena, anglesite, linarite, caledonite, quartz.

Distribution: From the Grand Reef mine, near Klondyke, Aravaipa district, Graham Co., Arizona, USA.

Name: For the Aravaipa mining district, Arizona, USA, where the mineral occurs.

Type Material: Natural History Museum, Los Angeles, California, 33608; National Museum of Natural History, Washington, D.C., USA, 166058.

References: (1) Kampf, A.R., P.J. Dunn, and E.E. Foord (1989) Grandreefite, pseudograndreefite, laurelite, and aravaipaite: four new minerals from the Grand Reef mine, Graham County, Arizona. *Amer. Mineral.*, 74, 927–933. (2) Kampf, A.R. and E.E. Foord (1996) Calcioaravaipaite, a new mineral, and associated lead fluoride minerals from the Grand Reef mine, Graham County, Arizona. *Mineral. Record*, 27, 293–300.