

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals prismatic, typically flattened and striated \parallel {100}, with {100}, {010}, and {110}, to 12.5 m and 54 t. Commonly massive. *Twinning:* Common on {100}.

Physical Properties: *Cleavage:* Good on {110}, $(110) \wedge (1\bar{1}0) \sim 87^\circ$; {100}, {010} partings. *Fracture:* Uneven to subconchoidal. *Tenacity:* Brittle. Hardness = 6.5–7 $D(\text{meas.}) = 3.03\text{--}3.23$ $D(\text{calc.}) = 3.184$ Yellow, orange, or pink fluorescence under LW and SW UV.

Optical Properties: Transparent to translucent. *Color:* Colorless, greenish white, grayish white, yellowish green, emerald-green, yellow, pink, violet, may be bicolored; colorless in thin section. *Streak:* White. *Luster:* Vitreous, pearly on cleavage.

Optical Class: Biaxial (+). *Pleochroism:* $X =$ purple to green; $Z =$ colorless. *Orientation:* $Y = b$; $Z \wedge c = 20^\circ\text{--}26^\circ$. *Dispersion:* $r < v$. $\alpha = 1.648\text{--}1.663$ $\beta = 1.655\text{--}1.669$ $\gamma = 1.662\text{--}1.679$ $2V(\text{meas.}) = 58^\circ\text{--}68^\circ$

Cell Data: *Space Group:* $C2/c$. $a = 9.45$ $b = 8.39$ $c = 5.215$ $\beta = 110^\circ$ $Z = 4$

X-ray Powder Pattern: Pala, California, USA (?). (ICDD 33-786). 2.921 (100), 2.793 (90), 4.205 (75), 6.12 (40), 4.36 (35), 3.444 (35), 3.190 (35)

Chemistry:

	(1)
SiO ₂	63.60
Al ₂ O ₃	27.48
Fe ₂ O ₃	0.04
MnO	0.14
MgO	< 0.02
CaO	< 0.02
Li ₂ O	7.79
Na ₂ O	0.22
H ₂ O ⁺	0.17
Total	99.44

(1) Pala, California, USA; corresponds to $(\text{Li}_{0.98}\text{Na}_{0.01})_{\Sigma=0.99}\text{Al}_{1.00}(\text{Si}_{1.99}\text{Al}_{0.01})_{\Sigma=2.00}\text{O}_6$.

Mineral Group: Pyroxene group.

Occurrence: A common constituent of lithium-rich granite pegmatites; in aplites and gneisses.

Association: Quartz, albite, petalite, eucryptite, lepidolite, beryl.

Distribution: From Utö, Södermanland, and in the Varuträsk pegmatite, 15 km northwest of Skellefteå, Västerbotten, Sweden. In Finland, from near Kuortane, and in the Tammela district. In the USA, giant crystals in the Etta mine, near Keystone, Pennington Co., and elsewhere in the Black Hills, South Dakota; at Hiddenite, Alexander Co. and in the Foote mine, Kings Mountain, Cleveland Co., North Carolina; from the Pala district, San Diego Co., California; and in the Harding mine, Dixon, Taos Co., New Mexico. From the Tanco mine, Bernic Lake, Manitoba, Canada. At the Urupuca mine, Itambacari, and at Resplendor, Minas Gerais, Brazil. From Mawi and Kantiva, Nuristan district, Laghman Province, Afghanistan. At Maharitra, Mt. Bity, and at Anjanabonoina, Madagascar. From Bikita, Zimbabwe. Many other minor localities are known.

Name: From the Greek for *ash-colored*, in allusion to its color.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 366–369.

(2) Deer, W.A., R.A. Howie, and J. Zussman (1978) Rock-forming minerals, (2nd edition), v. 2A, single-chain silicates, 527–544.

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