

Purpurite



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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Massive; cleavage fragments to 20 cm.

Physical Properties: *Cleavage:* {100}, good; {010}, imperfect; surfaces may be curved or crinkled. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 4–4.5 $D(\text{meas.}) = 3.2\text{--}3.4$ $D(\text{calc.}) = 3.69$

Optical Properties: Translucent to opaque. *Color:* Reddish purple to deep rose-red; commonly surficially dark brown to brownish black from alteration. *Streak:* Pale purple to pale red. *Luster:* Satiny on fresh fractures.

Optical Class: Biaxial (+). *Pleochroism:* X = greenish gray, gray to rose-red; $Y = Z$ = blood-red to purplish red; optic axis sections show anomalous green interference colors.

Orientation: $X = a$. *Dispersion:* Moderate. *Absorption:* $Z = Y > X$ or $Z > Y \gg X$. $\alpha = 1.85(2)$ $\beta = 1.86(2)$ $\gamma = 1.92(2)$ $2V(\text{meas.}) = 38^\circ$

Cell Data: *Space Group:* $Pmnb$. $a = 5.8237(6)$ $b = 9.766(1)$ $c = 4.7771(5)$ $Z = 4$

X-ray Powder Pattern: Namibia. (ICDD 37–478).

4.293 (100), 4.883 (70), 2.4423 (70), 3.455 (65), 2.912 (60), 2.946 (35), 2.4099 (30)

Chemistry:

	(1)	(2)
P_2O_5	47.30	47.20
Fe_2O_3	15.89	26.55
Mn_2O_3	29.25	26.25
CaO	1.48	
Na_2O	0.84	
Li_2O	trace	
H_2O	5.26	
insol.	0.52	
Total	100.54	100.00

(1) Faires tin mine, North Carolina, USA. (2) $(\text{Mn}, \text{Fe})\text{PO}_4$ with $\text{Mn}:\text{Fe} = 1:1$.

Polymorphism & Series: Forms a series with heterosite.

Occurrence: Derived from oxidation and leaching of primary Mn–Fe phosphates, particularly lithiophilite, in complex granite pegmatites; rarely, formed by reaction between bat guano and Fe–Mn deposits resulting from seawater ingress.

Association: Lithiophilite, sicklerite, many secondary Fe–Mn phosphates.

Distribution: A number of minor localities. In the USA, from the Faires tin mine, Kings Mountain, Gaston Co., North Carolina; at several mines in the Pala and Rincon districts, San Diego Co., California; in the White Picacho district, Yavapai Co., Arizona; large cleavages from the Crystal Mountain district, Larimer Co., Colorado; at the Custer Mountain mine and other pegmatites in Custer Co., South Dakota; from Branchville, Fairfield Co., Connecticut; at Greenwood and Rumford, Oxford Co., Maine. From the Mangualde pegmatite, near Mesquitela, Portugal. At the Varuträsk pegmatite, 15 km northwest of Skellefteå, Västerbotten, Sweden. In the Viitaniemi pegmatite, near Eräjärvi, Finland. From the La Vilate quarry, near Chanteloube, Haute-Vienne, France. At Wodgina, Western Australia. From the Karibib district, Namibia. In the Gunong Keriang Cave, Malaysia.

Name: From the Latin for *purple*, in allusion to its typical color.

Type Material: National Museum of Natural History, Washington, D.C., USA, 93883.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 675–677.

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