

Wilkinsonite



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Crystal Data: Triclinic. *Point Group:* 1 or $\bar{1}$. As very small anhedral grains, < 50 μm .

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. *Hardness* = ~ 5
D(meas.) = n.d. D(calc.) = 3.89

Optical Properties: Opaque to semitransparent. *Color:* Black. *Streak:* Brown.
Luster: Vitreous.

Optical Class: Biaxial (+). *Dispersion:* Strong. *Pleochroism:* Strong; X = olive-green;
Y = gray-brown; Z = very dark brown. *Absorption:* Z > Y > X. $\alpha = 1.79(1)$ $\beta = 1.79(1)$
 $\gamma = 1.90(1)$ $2V(\text{meas.}) = < 10^\circ$

Cell Data: *Space Group:* P1 or $P\bar{1}$. $a = 10.355(2)$ $b = 10.812(2)$ $c = 8.906(2)$
 $\alpha = 105.05(1)^\circ$ $\beta = 96.63(1)^\circ$ $\gamma = 125.20(1)^\circ$ $Z = 2$

X-ray Powder Pattern: Warrumbungle volcano, Australia.
8.10 (100), 3.149 (100), 2.696 (80), 2.533 (80), 2.115 (70), 2.935 (60), 1.481 (50)

Chemistry:	(1)	(2)	(1)	(2)	
SiO ₂	40.44	29.29	FeO	45.98	14.34
TiO ₂	0.63	0.04	MnO	1.25	2.07
ZrO ₂	0.20		NiO		0.15
Al ₂ O ₃	0.66	0.06	MgO	0.02	5.50
Fe ₂ O ₃		41.53	CaO	0.16	0.68
Cr ₂ O ₃		0.06	Na ₂ O	7.23	5.94
Nb ₂ O ₅	1.64		K ₂ O	0.05	0.75
			Total	98.26	100.41

(1) Warrumbungle volcano, Australia; by electron microprobe, average of 22 analyses of nine grains, Fe²⁺:Fe³⁺ calculated from stoichiometry in empirical analysis; corresponds to (Na_{2.04}Ca_{0.02}K_{0.01})_{Σ=2.07}(Fe_{3.90}Mn_{0.15})_{Σ=4.05}(Fe_{1.69}Nb_{0.11}Ti_{0.07}Zr_{0.01})_{Σ=1.88}(Si_{5.88}Al_{0.11})_{Σ=5.99}O₂₀. (2) Wonchi volcano, Ethiopia; by electron microprobe, average of five analyses, Fe²⁺:Fe³⁺ calculated from stoichiometry; corresponds to (Na_{1.68}K_{0.14}Ca_{0.11})_{Σ=1.93}(Fe_{1.75}Mg_{1.20}Fe_{0.92}Mn_{0.26}Ni_{0.02})_{Σ=4.15}(Fe_{1.93}Ti_{0.07})_{Σ=2.00}(Si_{4.27}Fe_{1.71}Al_{0.01}Cr_{0.01})_{Σ=6.00}O₂₀.

Polymorphism & Series: Forms a series with aenigmatite.

Mineral Group: Aenigmatite group.

Occurrence: In an eruptive peralkaline trachyte (Warrumbungle volcano, Australia); in syenite ejecta (Wonchi volcano, Ethiopia).

Association: Anorthoclase, sodalite, clinopyroxenes, nepheline, analcime, arfvedsonite, eudialyte (Warrumbungle volcano, Australia); riebeckite, biotite, aegirine, aenigmatite (Wonchi volcano, Ethiopia).

Distribution: At the Warrumbungle volcano and associated Bingie Grumble Mountain, New South Wales, Australia. On the Wonchi volcano, 90 km south of Addis Ababa, Ethiopia.

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Type Material: Petrological Museum, Bureau of Mineral Resources, Canberra, Australia, R29655.

References: (1) Duggan, M.B. (1990) Wilkinsonite, Na₂Fe₄²⁺Fe₂³⁺Si₆O₂₀, a new member of the aenigmatite group from the Warrumbungle Volcano, New South Wales, Australia. *Amer. Mineral.*, 75, 694–701. (2) Gaeta, M. and A. Mottana (1991) Phase relations of aenigmatite minerals in a syenitic ejectum, Wonchi volcano, Ethiopia. *Mineral. Mag.*, 55, 529–534.

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