

MinIdent-Win - willemite

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Formula: Zn₂SiO₄

Status: Mineral name is IMA approved or traditional

Level: Species

Parents: phenakite-group

Symmetry: Trigonal

Mean Atomic Number: 21.4

Diffraction Values: 2.635, 2.836, 3.488, 2.322, 1.861

Kretz abbreviation: Wlm

First Described in 1830



Space Group: R-3

Z number: 18

ICDD (TM) Number: 37-1485

	Minimum	Maximum	Average	Std. Dev.
a (A)	13.925	13.969	13.954	
b (A)	13.925	13.969	13.954	
c (A)	9.298	9.340	9.312	
Alpha	90.000	90.000	90.000	
Beta	90.000	90.000	90.000	
Gamma	120.000	120.000	120.000	
Volume	561.387	578.368	570.191	

	Minimum	Maximum	Average	Std. Dev.
n(Omega)	1.688	1.714	1.698	
n(Epsilon)	1.713	1.732	1.717	
Max. birefringence	0.009	0.028	0.019	
Optical Sign:	+ve			

C(Omega)		Orange Red, Blue, Colourless
C(Epsilon)		Orange Red, Blue, Colourless

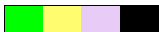
	Minimum	Maximum	Average	Std. Dev.
Mohs	5.5	5.5	5.5	
Vickers	615	615	615	
Density	3.89	4.26	4.14	0.08

	Total Min Wt (%)	Anal. Min Wt (%)	Average Wt (%)	Anal. Max Wt (%)	Total Max Wt (%)	Average Atomic	Coordination
H	0.0000	0.0000	0.0651	1.2500	1.2500	0.1450	
O	26.6961	26.6961	28.4564	30.9847	30.9847	4.0000	
Mg	0.0000	0.0000	0.2177	3.1361	3.1361	0.0201	
Al	0.0000	0.0000	0.0399	0.7621	0.7621	0.0033	4
Si	12.1581	12.1581	12.9082	14.2055	14.2055	1.0335	4
Cr	0.0000	0.0000	0.0014	0.0274	0.0274	0.0001	4
Mn	0.0000	0.0000	3.9643	12.5900	12.5900	0.1623	4
Fe	0.0000	0.0000	0.3390	1.8000	1.8000	0.0137	4
Co	0.0000	0.0000	0.9992	19.9845	19.9845	0.0381	4
Cu	0.0000	0.0000	0.0020	0.0399	0.0399	0.0001	4
Zn	37.7666	37.7666	53.2527	59.5942	59.5942	1.8322	4
Total			100.2459			7.2483	

Atomic proportions calculated for O = 4.0

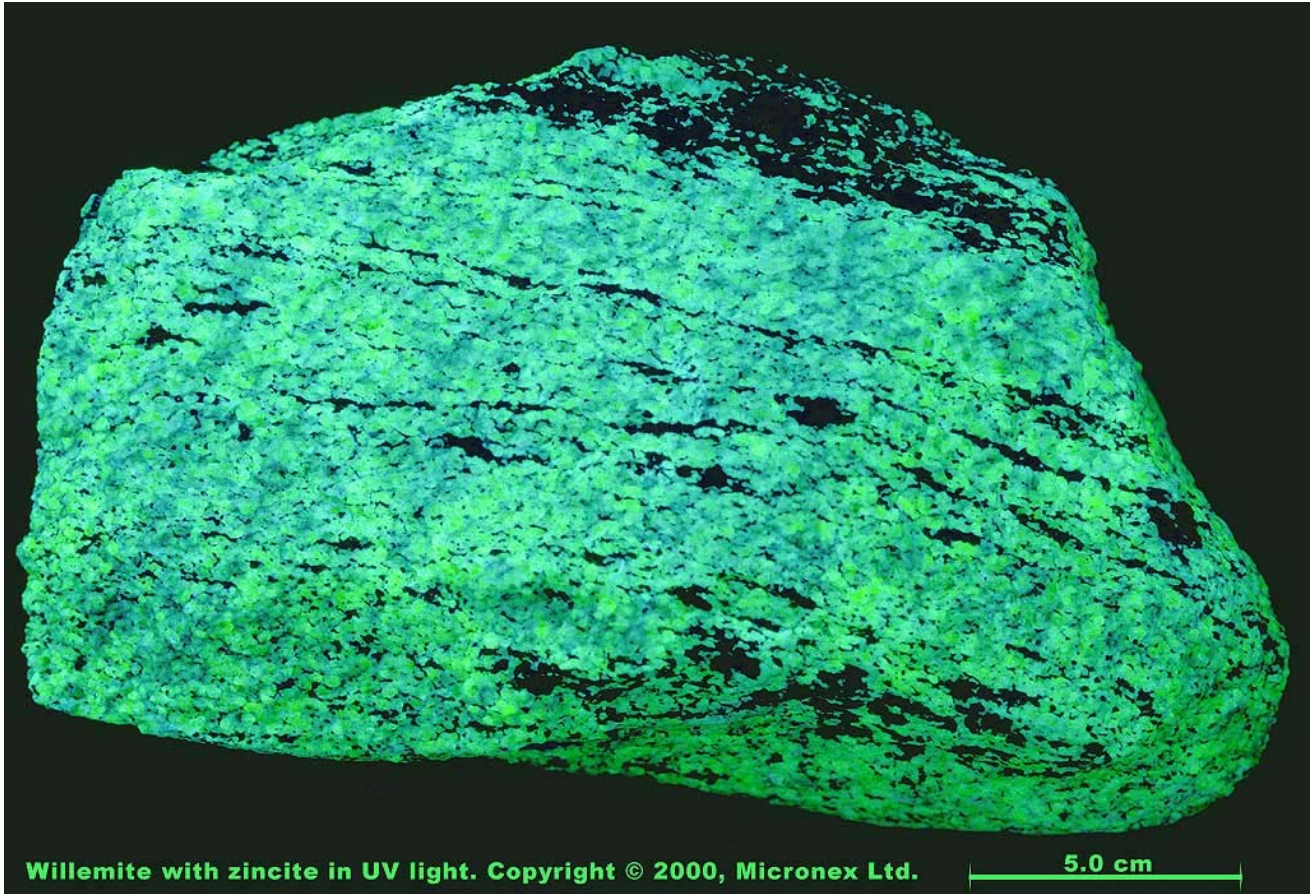
Compilation based on 4 general and 21 sample records

Values in italics are calculated from the minimum and maximum values. Other data are from the sample and general records.

Other lumin.  Cathodoluminescent: Green, Yellow, Pale Violet, Triboluminescence:

MinIdent-Win

Willemite with zincite in UV light



Willemite with zincite in UV light. Copyright © 2000, Micronex Ltd.

5.0 cm

Dorian G.W. Smith

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Caption: Roughly banded willemite-zincite ore is seen here under ultraviolet light. The zincite is black but this willemite which contains significant amounts of manganese, fluoresces vividly in shades of green. The mineral shows a similar intensity and colour of cathodoluminescence under the electron beam. This makes it a very useful mineral for beam focussing and adjustment purposes. The specimen comes from Franklin Furnace, New Jersey, U.S.A.

Keywords: willemite; zincite; silicates; oxides; fluorescence; green; cathodoluminescence; Franklin Furnace; New Jersey; U.S.A.; nesosilicates; orthosilicates; zinc ore

Acknowledgements: From a specimen in the collections of the University of Alberta, Edmonton, Canada.

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Comp. Plan.	Comp. Surf.	Twin Plane	Twin Axis	Notes
{010}			[001]	Penetration, Contact
{021}		{021}		Contact
{0-21}		{0-21}		Contact
{001}		{001}		Contact
{010}		{010}		Polysynthetic
			[010]	Parallel, Polysynthetic
			[100]	Parallel, Polysynthetic

Notes on hand specimen data: Commonly exhibits "labradorescence, a play of colours due to submicroscopic, film-like exsolution.

Synonyms: troostite

Remarks: Colourless, white, grey, yellow, green, brown and red. Lustre is vitreous to resinous. Brittle with conchoidal to uneven fracture and poor cleavages. Massive, granular and occasionally as prismatic to fibrous crystals. "Troostite" is a Mg-rich variety and the name "xingsaoite" has been used for a dark blue-violet cobaltian variety. May fluoresce and cathodoluminesce brilliantly in shades of yellow/green. Sometimes strongly phosphorescent.

Occurrences: In crystalline limestone and also in the oxidised zone of Zn-deposits.

Localities of samples used in compilation: Ilímaussaq and Mussartut, Greenland. Sterling and Franklin, New Jersey; Merrit mine, Socorro, New Mexico, U.S.A. Altenberg, Moresnet; Stolberg, Belgium. Xingsao, Hunan province, China. Mt. St. Hilaire, Québec, Canada.

References: Amer. Min. v.76, p.669; v.92, p.1225-1231. Min. Mag. v.41, p.71-75. Can. Min. v.45, p. 865-873. Dana (6th) p.460-461. Roberts et al. (1974). USGS Bull. 1627. Phillips & Griffen (1981) Opt. Min.