

# MinIdent-Win - pyrope

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**Formula:**  $Mg_3Al_2[SiO_4]_3$

**Status:** Mineral name is IMA approved or traditional

**Level:** Species

**Parents:** knorringite-pyrope-series and almandine-pyrope-series

**Symmetry:** Cubic

**Mean Atomic Number:** 12.5

**Diffraction Values:** 2.570, 2.870, 1.535, 2.870, 2.440

**Kretz abbreviation:** Prp

**First Described** in 1803

**Space Group:** Ia-3d

**Z number:** 8

**ICDD (TM) Number:** 15-742

	Minimum	Maximum	Average	Std. Dev.
a (Å)	11.459	11.585	11.533	0.030
b (Å)	11.459	11.585	11.533	0.030
c (Å)	11.459	11.585	11.533	0.030
Alpha	90.000	90.000	90.000	
Beta	90.000	90.000	90.000	
Gamma	90.000	90.000	90.000	
Volume	504.666	554.849	534.125	

	Minimum	Maximum	Average	Std. Dev.
n	1.714	1.772	1.755	0.011

**Colour**  Pink, Pale Pink, Colourless

	Minimum	Maximum	Average	Std. Dev.
Mohs	6.5	7.5	7.0	
Vickers	943	1343	1133	
Density	3.50	3.91	3.81	0.08

	Total Min Wt (%)	Anal. Min Wt (%)	Average Wt (%)	Anal. Max Wt (%)	Total Max Wt (%)	Average Atomic	Coordination
H	0.0000	0.0000	0.0046	0.1500	0.1500	0.0198	
C	0.0000	0.0000	0.0005	0.0191	0.0191	0.0002	
O	42.2096	42.2096	44.1866	45.9378	48.1000	12.0000	
Na	0.0000	0.0000	0.0363	0.1558	0.1558	0.0069	
Mg	6.5678	6.5678	11.7220	14.8906	18.2705	2.0952	8
Al	7.0920	7.0920	10.7131	13.0831	13.5181	1.7254	6
Si	18.3470	18.3470	19.3184	20.2167	21.1114	2.9883	4
P	0.0000	0.0000	0.0049	0.0873	0.0873	0.0007	
K	0.0000	0.0000	0.0055	0.0581	0.0581	0.0006	
Ca	0.0000	0.7004	2.8434	8.3620	8.3620	0.3083	8
Ti	0.0000	0.0000	0.1315	0.5396	0.5396	0.0119	
V	0.0000	0.0000	0.0013	0.0500	0.0500	0.0001	
Cr	0.0000	0.0000	2.6896	9.6199	9.6199	0.2247	6
Mn	0.0000	0.0232	0.3763	3.2063	3.2063	0.0298	
Fe	0.0000	3.9876	7.9941	17.0231	17.0231	0.6220	6 8
Co	0.0000	0.0000	0.0000	0.0016	0.0016	0.0000	
Ni	0.0000	0.0000	0.0129	0.4872	0.4872	0.0010	
Zn	0.0000	0.0000	0.0008	0.0321	0.0321	0.0001	
<b>Total</b>			100.0418			20.0348	

Atomic proportions calculated for O = 12.0

Compilation based on 2 general and 39 sample records

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

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general records.

**Other lumin.**  Cathodoluminescent: Pale Blue

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:** cape-ruby

**Remarks:** Usually occurs as rounded grains and occasionally as dodecahedral or icositetrahedral crystals which are some shade of red (often pinkish), and have a vitreous lustre. Pyrope is hard and has no cleavage but a ready subconchoidal fracture. It is a member of the "pyralspite" (pyrope - almandine - spessartine) group of garnets. Because it can occur in kimberlites, it is an important diamond indicator mineral.

**Occurrences:** In peridotites and associated serpentinites, in eclogites, some anorthosites, and as a detrital mineral in the sands and gravels which are derived from such rocks. Also common in kimberlites.

**Localities of samples used in compilation:** Mukun, Arymastakh R.; Kokchetav massif; Udachnaya pipe, Yakutia, Russia. Cerrin, S. Moravia, Czechoslovakia. Silberbach, Fichtelgebirge, Germany. Gore Mtns., Essex Co., N.Y.; Macon Co., N.C.; Riley Co., Kansas, U.S.A. Excelsior kimberlite pipe; Kimberly Pool; Postmasburg, Griqualand; Wesselton mine, S. Africa. Matsoku, Lesotho. Uмба River, Tanzania. Mbuji-Mayi, Kasai, Zaire. Groonoy; Uglvik, nr. Otteroy, Norway. Delegate, N.S.W, Australia. China. And others worldwide.

**References:** Dok. Akad. Nauk SSSR. Deer et al. (1962) v.1, p.97; (1982) v.1A, p.498.

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## Diamonds with indicator minerals



Dorian G.W. Smith

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**Caption:** collection of "diamond indicator minerals" forms part of a museum exhibit. The minerals olivine, pyrope, zircon and ilmenite occurring together and their particular detailed compositional characteristics, suggest that diamonds may be present in the same sediments or nearby bedrock. The ilmenite characteristically contains substantial amounts of Mg substituting for Fe - and is given the varietal name "picroilmenite"; the garnet is the Mg-rich species pyrope rather than almandine which is much more common in crustal rocks. A few larger diamonds are scattered between the dishes. Locality: Yakutia, Siberia, Russia.

**Keywords:** diamond; pyrope; ilmenite; picroilmenite; garnets; olivine; chrysolite; forsterite; zircon; indicator minerals; Myrny Diamond Museum; Yakutia; Siberia; Russia; forsterite-fayalite-series

**Acknowledgements:** From a photograph kindly made available by Professor Roger D. Morton. (samples exhibited in the Myrny Diamond Museum)