

MinIdent-Win - monazite-(Ce)

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Formula: (Ce,La,Nd,Th)PO₄

Status: Mineral name is IMA approved or traditional

Level: Species

Parents: phosphates and monazite-group

Symmetry: Monoclinic

Mean Atomic Number: 40.7

Diffraction Values: 3.095, 2.871, 3.273, 1.969, 2.184

Kretz abbreviation: Mnz

First Described in 1829

Space Group: P2




Z number: 4

ICDD (TM) Number: 11-556

	Minimum	Maximum	Average	Std. Dev.
a (A)	6.717	6.870	6.770	
b (A)	6.910	7.039	6.982	
c (A)	6.430	6.510	6.465	
Alpha	90.000	90.000	90.000	
Beta	103.167	104.600	103.795	
Gamma	90.000	90.000	90.000	
Volume	290.599	304.645	296.774	

	Minimum	Maximum	Average	Std. Dev.
n(Alpha)	1.730	1.800	1.780	
n(Beta)	1.730	1.801	1.781	
n(Gamma)	1.746	1.865	1.829	
Max. birefring	0.046	0.070	0.049	
2V Gamma	5	26	20	

Optical Sign: +ve **OAP Orientation:** Perp (010)

C(Alpha)		Pale Yellow, Green, Colourless
C(Beta)		Brown, Pale Brown, Yellow, Pale Yellow, Green, Colourless
C(Gamma)		Pale Yellow, Greenish Yellow, Yellowish Green, Colourless
Dispersion	V>R	

	Minimum	Maximum	Average	Std. Dev.
Mohs	3.5	5.5	4.5	
Vickers	182	618	365	
Density	4.30	5.40	5.16	

	Total Min Wt (%)	Anal. Min Wt (%)	Average Wt (%)	Anal. Max Wt (%)	Total Max Wt (%)	Average Atomic	Coordination
H	0.0000	0.0000	0.0274	0.2272	0.2272	0.0637	
O	20.3051	20.3051	27.2397	32.8946	32.8946	4.0000	
Mg	0.0000	0.0000	0.0163	0.2533	0.2533	0.0016	
Al	0.0000	0.0000	0.0344	0.4234	0.4234	0.0030	
Si	0.0000	0.0140	0.8925	6.1608	6.1608	0.0747	4
P	10.5090	10.5090	12.7288	17.1059	17.1059	0.9657	4
S	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
K	0.0000	0.0000	0.0368	0.5894	0.5894	0.0022	
Ca	0.0000	0.0000	0.8799	5.3245	5.3245	0.0516	9
Ti	0.0000	0.0000	0.0161	0.2518	0.2518	0.0008	
Mn	0.0000	0.0000	0.0194	0.3098	0.3098	0.0008	
Fe	0.0000	0.0000	0.0982	1.9304	1.9304	0.0041	
Sr	0.0000		0.8879		1.7757	0.0238	
Y	0.0000	0.0000	0.7448	10.5123	10.5123	0.0197	9
Zr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	9
Nb	0.0000	0.0000	0.0034	0.0151	0.0151	0.0001	
Sn	0.0000	0.0000	0.0001	0.0008	0.0008	0.0000	
La	0.0000	0.0000	11.9042	22.5960	29.6202	0.2013	9

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Ce	8.5377	8.5377	23.7059	31.4271	59.6027	0.3975	9
Pr	0.0000	0.0000	2.4898	3.9904	3.9904	0.0415	9
Nd	0.0000	0.0000	9.7865	23.0026	30.4111	0.1594	9
Sm	0.0000	0.0000	1.7647	6.2261	6.2261	0.0276	9
Eu	0.0000	0.0000	0.1675	0.7513	0.7513	0.0026	
Gd	0.0000	0.0000	0.8623	2.5420	2.5420	0.0129	9
Tb	0.0000	0.0000	0.0476	0.2606	0.2606	0.0007	9
Dy	0.0000	0.0000	0.5817	4.1388	4.1388	0.0084	9
Ho	0.0000	0.0000	0.0100	0.1135	0.1135	0.0001	9
Er	0.0000	0.0000	0.2390	2.7897	2.7897	0.0034	9
Tm	0.0000	0.0000	0.0100	0.1051	0.1051	0.0001	9
Yb	0.0000	0.0000	0.2325	2.9859	2.9859	0.0032	9
Lu	0.0000	0.0000	0.1571	1.8467	1.8467	0.0021	9
Hf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Ta	0.0000	0.0000	0.0001	0.0009	0.0009	0.0000	
W	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Pb	0.0000	0.0000	0.2646	1.0676	1.0676	0.0030	
Th	0.0000	0.0000	4.4461	31.8568	41.2809	0.0450	9
U	0.0000	0.0000	0.9782	13.7866	13.7866	0.0097	9
Total			101.2735			6.1303	

Atomic proportions calculated for O = 4.0

Compilation based on 9 general and 31 sample records

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

Synonyms: monazite, silicomanzite

Remarks: Usually massive or granular, only rarely occurring as crystals. It is usually yellowish brown to reddish brown but can be a wide variety of other colours, including green. The lustre is generally resinous. Monazite-(Ce) is not easily identified in the hand specimen and is often considered to be a rare mineral. In reality, it is quite widespread although usually occurring only in small quantities. The mineral is very frequently somewhat radioactive due to the presence of Th. Data for a particular Th-rich variety, originally published under the name, cheralite, is included here.

Occurrences: A detrital mineral in placer deposits, beach and river sands. Also found in pegmatites, metamorphic rocks and vein deposits, in carbonatites and alkali syenites.

Localities of samples used in compilation: Afon Gwesyn; Harlech Dome, Wales; Exmoor, Devon, United Kingdom. Kuttakushi in Halkulam taluk, Travancore, Kerala State, India. Suordakh Creek, Obryvistyy Creek, Solur Creek, Vera Creek, Dzhatuk Creek and Indigirka River, northeastern Yakutia; Kular District; Russia. Schwarzwald, southwestern Germany. Blausee, Binnental, Switzerland. Mont St. Hilaire, Québec, Canada. Mountain Pass, San Bernardino County, California, U.S.A. Haast River area, South Island, New Zealand.

References: Min. Mag. v.30, p.93-99; v.51, p.271-280; v.71, p.223-234. Dokl. Akad. Nauk SSSR v.268, p.151. Deer et al. (1962) v.5, p.339-346. Schweiz. Min. Pet. Mitt. v.67, p.103-113. Amer. Min. v.52, p.13-19; v.63, p.757. Mandarino & Anderson (1989). Can. Min. v.44, p.1557-1560; v.46, p.753-777.

MinIdent-Win

Monazite-(Ce)



Monazite-(Ce). Copyright © 2000, Micronex Ltd.

Dorian G.W. Smith

1.0 cm

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Caption: A mass of compact granular monazite from an ilmeno-hematite - monazite - apatite deposit enclosed by granite (ref.: Watkinson & Mainwaring, (1976) Can. J. Earth Sci. v.13.) Note the characteristically rather resinous lustre and the typical reddish brown colour. Monazite such as this can be distinguished from zircon by the latter's superior hardness and from sphene by the habit; also, monazite is commonly somewhat radioactive. Locality: Kulyk Lake, Saskatchewan, Canada.

Keywords: monazite; phosphates; rare earth elements; rare earths; granular mode of aggregation; equant habit; massive mode of aggregation; radioactivity; Kulyk Lake; Saskatchewan; Canada; monazite-(Ce)

Acknowledgements: From the collections of the University of Alberta (specimen no. 9398). Photography by Dorian Smith.