

# MinIdent-Win - clinochlore

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**Formula:**  $(\text{Mg,Fe}^{2+})_5\text{Al}[\text{Si}_3\text{Al}]\text{O}_{10}[\text{OH}]_8$

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

**Level:** Species

**Parents:** chamosite-clinocllore-series

**Symmetry:** Monoclinic

**Mean Atomic Number:** 11.9

**Diffraction Values:** 2.543, 7.135, 14.180, 3.567, 1.540

**Kretz abbreviation:** Clc

**First Described** in 1851

**Space Group:** C2/m

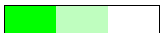
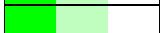
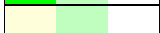
**Z number:** 2

**ICDD (TM) Number:** 7-165

	Minimum	Maximum	Average	Std. Dev.
a (Å)	5.270	5.360	5.315	
b (Å)	9.200	9.283	9.242	
c (Å)	14.044	14.380	14.212	
Alpha	90.000	90.000	90.000	
Beta	96.967	97.250	97.108	
Gamma	90.000	90.000	90.000	
Volume	675.882	709.783	692.710	

	Minimum	Maximum	Average	Std. Dev.
n(Alpha)	1.553	1.670	1.604	0.026
n(Beta)	1.554	1.622	1.597	0.017
n(Gamma)	1.558	1.685	1.614	0.027
Max. birefringence	0.003	0.020	0.006	
2V Gamma	0	180	10	

**Optical Sign:** +ve or -ve **OAP Orientation:** Parallel (010)

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

	Minimum	Maximum	Average	Std. Dev.
Mohs	2.0	3.0	2.5	
Vickers	30	116	65	
Density	2.50	3.08	2.82	0.12

	Total Min Wt (%)	Anal. Min Wt (%)	Average Wt (%)	Anal. Max Wt (%)	Total Max Wt (%)	Average Atomic	Coordination
H	1.1145	1.1145	1.3819	2.1966	2.1966	8.2210	
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
C	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
O	45.0829	45.0829	48.7233	54.3093	54.3093	18.2973	
F	0.0000	0.0000	0.0225	0.5400	0.5400	0.0071	
Na	0.0000	0.0000	0.0258	0.2151	0.2151	0.0067	
Mg	5.6752	5.6752	14.4557	22.7008	22.7008	3.5729	6
Al	5.0279	5.0279	10.3725	14.6496	14.6496	2.3100	4 6
Si	10.8446	10.8446	13.3783	17.0288	17.0288	2.8617	4
P	0.0000	0.0000	0.0005	0.0131	0.0131	0.0001	
K	0.0000	0.0000	0.0237	0.3155	0.3155	0.0036	
Ca	0.0000	0.0000	0.1950	0.8862	0.8862	0.0292	
Ti	0.0000	0.0000	0.0542	0.5276	0.5276	0.0068	6
V	0.0000	0.0000	0.0022	0.0600	0.0600	0.0003	6
Cr	0.0000	0.0000	0.2412	5.3915	5.3915	0.0279	6
Mn	0.0000	0.0000	0.4000	6.3815	6.3815	0.0437	6
Fe	0.0000	0.0000	10.9237	23.6085	23.6085	1.1752	6
Ni	0.0000	0.0000	0.0146	0.2200	0.2200	0.0015	6

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<b>Zn</b>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>			100.2151			36.5652

Atomic proportions calculated for Mg+Al+Si+Ti+V+Cr+Mn+Fe+Ni = 10.0

Compilation based on 9 general and 28 sample records

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

<b>Lustre</b>	Vitreous, Pearly, Earthy, Submetallic, Dull
<b>Aggregation</b>	Lamellar, Scaly, Radiating, Vermicular, Massive, Granular, Disseminated, Foliateous, Scaly
<b>Habit</b>	Tabular, Hexagonal, Prismatic
<b>Tenacity</b>	Flexible, Inelastic, Tough
<b>Cleavage</b>	{001} Perfect
<b>Surface Colour</b>	 Dark Green, Bluish Green, Dark Bluish Green, Colourless, White, Dark Blue, Dark Bluish Black, Purple Red, Pinkish Red, Pale Brownish Green, Pale Green, Greenish Black
<b>Streak</b>	 Colourless, White, Pale Grey, Pale Greyish Green
<b>Fluor. Short</b>	 Greyish Brown
<b>Fluor. Long</b>	 Orange, Pale Green

**Notes on hand specimen data:** Rare, prismatic crystals may be stubby and barrel-shaped. In bulk the mineral may have a soapy feel.

**Synonyms:** corundophilite, delessite, kaemmererite, kammererite, klementite, kotschubeite, melanolite, pennine, penninite, pycnochlorite, sheridanite

**Remarks:** Colour is variable but usually some shade of green. Perfect basal cleavage. Data is included here for the varieties: corundophilite, delessite, kammererite, kotschubeite, pennine (=penninite), pycnochlorite, ripidolite, and sheridanite Other members of the trioctahedral chlorite group are chamosite, pennantite and nimite. Anomalous 1st order interference colours common.

**Occurrences:** Although the principal occurrence of the mineral is in greenschist facies phyllites and schists, it has also been reported from many other parageneses, including in chromite deposits associated with uvarovite, emery deposits, in a vein in granite, in a diabase, associated with hyaline quartz, in a rodingite dyke, in a talc-serpentine schist and in a dravite-chlorite rock.

**Localities of samples used in compilation:** Farmington Hills, Connecticut; Miles City; Philipsburg, Montana; Burra Burra, Ducktown, Tennessee. Deer Park, Wyoming; Chester County; Sommerville, Massachusetts; Chester, Vermont; West Town, Pennsylvania, U.S.A. Black Lake area, Québec, Canada. Near Trapiche, Sierras de San Luis, Argentina. Vielsalm, Belgium. Messina-sur-Limpopo, Transvaal; Prieska district, Cape Province, South Africa. Androta, Madagascar. Springburn; Coronet Peak; Wakatipu region, western Otago; Aorere, Nelson; Kaukapakapa, Auckland, New Zealand. Limebury Point, Salcombe estuary, south Devon, England. Baita Bihor, Bihor massif, Apuseni Mountains, Romania. And other localities worldwide.

**References:** Mineral. Petrol. v.71: 95-126. Can. Min. v.39, p.111-127. Deer et al. (1962) v.3, p.139-145. Min. Abs. v.5, p.285. Roberts et al. (1990) Encycl. Mins. USGS Bull. 1627. Phillips & Griffen (1981) Opt. Min.

# MinIdent-Win

Clinochlore (chlorite)

**Clinochlore (chlorite). Copyright © 2000, Micronex Ltd.**



Dorian G.W. Smith

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**Caption:** In this image, a large platy crystal of chlorite shows its common dark greenish colour and its perfect basal cleavage. Although the composition of this particular specimen has not been determined, it will almost certainly be a solid solution of clinochlore and chamosite and will most probably be closer to the former. Note that the mineral is distinguished from biotite by its colour and also by its flexible but inelastic cleavage laminae. Similar compositions of chlorite are common as much smaller crystals in pelitic rocks in the green schist facies of regional metamorphism. For scale, the one cent copper coin at the lower left is 1.9 cm in diameter. Locality: Near Strachur, Argyllshire, Scotland.

**Keywords:** clinochlore; chlorites; sheet silicates; phyllosilicates; cleavage; Strachur; Argyllshire; Scotland; Platy habit

**Acknowledgements:** From the personal collection of Dorian Smith. Photography by Frank Dimitrov and Dorian Smith.