

# Lizardite

# Mg<sub>3</sub>Si<sub>2</sub>O<sub>5</sub>(OH)<sub>4</sub>

©2001 Mineral Data Publishing, version 1.2

**Crystal Data:** Hexagonal, pseudo-orthorhombic. *Point Group:*  $3m$  (1A);  $6mm$  ( $2H_1$ ). Crystals rare, to 2 mm, as trigonal plates to truncated trigonal pyramids. Commonly as extremely fine-grained scales and massive aggregates.

**Physical Properties:** *Cleavage:* Perfect on {0001}. *Tenacity:* Crystals are easily bent. Hardness = 2.5 D(meas.) = 2.55(3) D(calc.) = 2.57

**Optical Properties:** Translucent. *Color:* Green, light yellow to white; colorless to pale green in thin section. *Luster:* Waxy.

*Optical Class:* Uniaxial (-) to slightly biaxial (-).  $\alpha = 1.538$ – $1.554$   $\beta = 1.546$ – $1.560$   $\gamma = 1.546$ – $1.560$   $2V$ (meas.) = Small.

**Cell Data:** *Space Group:*  $P31m$  (1A).  $a = 5.325(5)$   $c = 7.259(7)$   $Z = 2$ , or *Space Group:*  $P6_3cm$  ( $2H_1$ ).  $a = 5.318(4)$   $c = 14.541(7)$   $Z = [4]$

**X-ray Powder Pattern:** Kennack Cove, England (1A).  
7.4 (100), 2.505 (100), 4.6 (80), 3.67 (80), 2.156 (80), 1.538 (80), 1.505 (80)

Chemistry:	(1)	(2)	(1)	(2)	
SiO <sub>2</sub>	44.29	41.80	FeO	1.81	
TiO <sub>2</sub>	0.03		MgO	40.43	40.69
Al <sub>2</sub> O <sub>3</sub>	2.18	2.79	CaO	0.03	
Fe <sub>2</sub> O <sub>3</sub>	0.50		H <sub>2</sub> O <sup>+</sup>	12.42	[12.90]
			Total	99.88	[99.99]

(1) Kennack Cove, England; corresponds to (Mg<sub>2.74</sub>Al<sub>0.12</sub>Fe<sub>0.02</sub><sup>3+</sup>)<sub>Σ=2.88</sub>Si<sub>2.00</sub>O<sub>5.13</sub>(OH)<sub>3.87</sub>.

(2) Coli, Italy; by electron microprobe, 2H<sub>2</sub>O assumed; corresponds to (Mg<sub>2.82</sub>Al<sub>0.09</sub>Fe<sub>0.07</sub>)<sub>Σ=2.98</sub>(Si<sub>1.94</sub>Al<sub>0.06</sub>)<sub>Σ=2.00</sub>O<sub>5</sub>(OH)<sub>4</sub>.

**Polymorphism & Series:** 1A, 6A,  $2H_1$  polytypes; polymorphous with antigorite, clinochrysotile, orthochrysotile, and parachrysotile; forms a series with népouite.

**Mineral Group:** Kaolinite-serpentine group.

**Occurrence:** Typically a product of retrograde metamorphism, replacing olivine, orthopyroxene, or other minerals in ultramafic igneous rocks.

**Association:** Chrysotile, brucite, magnetite.

**Distribution:** Probably the most common serpentine mineral. A few prominent localities for well-studied material include: at Kennack Cove, The Lizard, Cornwall, England. On Unst, Shetland Islands, Scotland. From near Val Sissone, Lombardy, and Val Trebbia, Piacenza, Italy. In Japan, from Maruo Odori and Kodo, Yamaguchi Prefecture, and at Hamao, Fukuoka Prefecture. At Woodsreef, New South Wales, Australia. From the Jeffrey mine, Asbestos, Quebec, and the Cassiar mine, British Columbia, Canada. In the USA, in the Stillwater complex, Montana.

**Name:** For the type locality, the Lizard complex, Cornwall, England.

**Type Material:** The Natural History Museum, London, England, 1955,243; National Museum of Natural History, Washington, D.C., USA, 114569.

**References:** (1) Whittaker, E.J.W. and J. Zussman (1956) The characterization of serpentine minerals by X-ray diffraction. *Mineral. Mag.*, 31, 107–126. (2) (1957) *Amer. Mineral.*, 42, 585 (abs. ref. 1). (3) Deer, W.A., R.A. Howie, and J. Zussman (1963) *Rock-forming minerals*, All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Mineral Data Publishing.

v. 3, sheet silicates, 170–190. (4) Rucklidge, J.C and J. Zussman (1965) The crystal structure of the serpentine mineral, lizardite  $\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$ . *Acta Cryst.*, 19, 381–389. (5) Wicks, F.J. and E.J.W. Whittaker (1975) A reappraisal of the structures of the serpentine minerals. *Can. Mineral.*, 13, 227–243. (6) Mellini, M. and P.F. Zanazzi (1987) Crystal structures of lizardite-1*T* and lizardite-2*H1* from Coli, Italy. *Amer. Mineral.*, 72, 943–948. (7) Wicks, F.J. and D.S. O’Hanley (1988) Serpentine minerals: structures and petrology. In: S.W. Bailey, Ed., *Hydrous phyllosilicates*. *Rev. Mineral.* 19, MSA, 91–167.