

Crystal Data: Monoclinic. *Point Group:* $2/m$, 2 , or m . As platy crystals and flakes, to 1.5 mm.

Physical Properties: *Cleavage:* {001}, perfect; {010} and {100}, poor. Hardness = 2.5
D(meas.) = 3.264(2) D(calc.) = 3.255

Optical Properties: Translucent. *Color:* Black to brown-black; in transmitted light, bright yellow, lime-green or olive-green, honey-brown, may be color zoned with a green core and yellow rim. *Luster:* Vitreous.

Optical Class: Biaxial (+). *Pleochroism:* Strong; X = yellow; Y = lime-green to olive-green; Z = yellow-brown. *Orientation:* Z = b; Y \wedge a = 20°. *Dispersion:* r > v, strong. $\alpha = 1.636(1)$
 $\beta = 1.687(1)$ $\gamma = 1.785(5)$ $2V(\text{meas.}) = 74.0^\circ$ $2V(\text{calc.}) = 75.2^\circ$

Cell Data: *Space Group:* $C2/m$, $C2$, or Cm . a = 5.289(3) b = 8.914(3) c = 10.062(7)
 $\beta = 98.22(5)^\circ$ Z = 2

X-ray Powder Pattern: Hoskins mine, Australia.

10.01 (10), 3.329 (8), 3.160 (7), 3.571 (6), 2.365 (6), 4.464 (5), 2.620 (5)

Chemistry:

	(1)
SiO ₂	50.37
TiO ₂	0.15
Al ₂ O ₃	1.31
Fe ₂ O ₃	< 0.02
Mn ₂ O ₃	34.68
MgO	0.32
CaO	0.00
BaO	0.13
Li ₂ O	3.1
Na ₂ O	0.04
K ₂ O	10.39
F	< 0.09
Cl	< 0.01
H ₂ O ⁺	0.66
Total	101.15

(1) Hoskins mine, Australia; by electron microprobe, average of four analyses; H₂O by gravimetric analysis, Li by atomic emission and AA, oxidation state by titration; corresponds to (K_{0.98}Ba_{0.01}) $_{\Sigma=0.99}$ (Mn_{2.00}³⁺Li_{0.95}Mg_{0.02}) $_{\Sigma=2.97}$ (Si_{3.84}Al_{0.10}) $_{\Sigma=3.94}$ O_{11.66}(OH)_{0.34}.

Mineral Group: Mica group.

Occurrence: A major to minor component of manganese schists, formed through metamorphism of a stratiform manganese deposit.

Association: Manganoan-alkalic amphibole, manganoan-alkalic clinopyroxene, manganoan pectolite-sérandite, braunite, calcium carbonates, barium carbonates, albite, potassic feldspar, quartz, barite.

Distribution: From the Hoskins mine, three km west of Grenfell, New South Wales, Australia.

Name: In honor of Dr. Keith Norrish of the Division of Soils, Commonwealth Scientific and Industrial Research Organization, Australia.

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.

Type Material: Australian Museum, Sydney; Australian National University, Canberra, A.C.T.; University of New England, Armidale, New South Wales, Australia.

References: (1) Eggleton, R.A. and P.M. Ashley (1989) Norrishite, a new manganese mica, $\text{K}(\text{Mn}_2^{3+}\text{Li})\text{Si}_4\text{O}_{12}$, from the Hoskins mine, New South Wales, Australia. *Amer. Mineral.*, 74, 1360–1367. (2) Tyrna, P.L. and S. Guggenheim (1991) The crystal structure of norrishite, $\text{KLiMn}_2^{3+}\text{Si}_4\text{O}_{12}$: an oxygen-rich mica. *Amer. Mineral.*, 76, 266–271.