

Ferrierite**(Na, K)₂Mg(Si, Al)₁₈O₃₆ • 9H₂O**

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Crystal Data: Orthorhombic; rarely monoclinic. *Point Group:* 2/m 2/m 2/m or 2/m. Radiating groups of thin lath-shaped crystals, tabular on {100}, elongated along [001], to 2.5 cm.

Physical Properties: *Cleavage:* {100}, perfect. Hardness = 3–3.5 D(meas.) = 2.136 D(calc.) = 2.11

Optical Properties: Transparent to translucent. *Color:* White, colorless, pinkish, orange to red. *Streak:* White. *Luster:* Vitreous to pearly.

Optical Class: Biaxial (+). *Orientation:* X = a; Y = b; Z = c. α = 1.473–1.479 β = 1.474–1.483 γ = 1.477–1.486 2V(meas.) = 50°

Cell Data: *Space Group:* Immm. a = 18.90–19.22 b = 14.14–14.16 c = 7.48–7.54 Z = 2, or *Space Group:* P2₁/n. a = 18.886(9) b = 14.182(6) c = 7.470(5) Z = 2

X-ray Powder Pattern: Agoura, California, USA. 3.537 (100), 3.778 (65), 9.47 (50), 7.07 (38), 3.977 (35), 3.943 (35), 3.313 (35)

Chemistry:	(1)	(2)		(1)	(2)
SiO ₂	70.14	71.21	BaO	0.38	
Al ₂ O ₃	11.45	9.84	Na ₂ O	1.86	1.59
Fe ₂ O ₃	0.13	0.05	K ₂ O	0.63	2.85
MgO	2.56	1.70	H ₂ O ⁺		4.25
CaO	0.15		H ₂ O ⁻		8.63
SrO	0.18		H ₂ O	[12.52]	
			Total	[100.00]	100.12

(1) Kamloops Lake, Canada; by electron microprobe, H₂O by difference; corresponding to (Na_{0.78}K_{0.18})_{Σ=0.96}(Mg_{0.82}Ca_{0.04}Ba_{0.04}Sr_{0.02})_{Σ=0.92}(Si_{15.11}Al_{2.90})_{Σ=18.01}O₃₆ • 9H₂O.

(2) Itomuka mine, Japan; by electron microprobe, H₂O by Penfield method, corresponding to (K_{0.78}Na_{0.66})_{Σ=1.44}Mg_{0.54}(Si_{15.48}Al_{2.52})_{Σ=18.00}O₃₆ • 9.41H₂O.

Mineral Group: Zeolite group.

Occurrence: In seams and vesicles in deeply weathered basalts, flow breccias, and andesites; in tuffaceous sediments.

Association: Zeolites, plagioclase, “hypersthene,” augite, montmorillonite, “chalcedony,” calcite.

Distribution: In Canada, in British Columbia, at Kamloops Lake, near Kamloops, and at Monte Lake and Pinaus Lake, near Westwold. In the USA, from Altoona, Wahkiakum Co., Washington; near Agoura, Los Angeles Co., and on Silver Mountain, southwest of Markleeville, Alpine Co., California. From Albero Basso and Val Timonchio, Vicenza, and near Monastir, Cagliari, Sardinia, Italy. At Weitendorf, near Wildon, Styria, Austria. From Reichweiler, Rhineland-Palatinate, Germany. On Phillip Island, Victoria, and at Unanderra, New South Wales, Australia. In the Itomuka mine, Hokkaido, and at Tadumi, Fukushima Prefecture, Japan. A number of other occurrences are known.

Name: For Dr. Walter Frederick Ferrier (1865–1950), geologist and mining engineer with the Canadian Geological Survey.

Type Material: McGill University, Montreal, Canada, RMF3099.

References: (1) Graham, R.P.D. (1918) Ferrierite, a new zeolitic mineral from British Columbia, with notes on some other Canadian minerals. *Trans. Royal Soc. Canada*, 12(3), 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.

185–201. (2) (1919) *Amer. Mineral.*, 4, 90 (abs. ref. 1). (3) Wise, W.S., W.J. Nokleberg, and M. Kokinos (1969) Clinoptilolite and ferrierite from Agoura, California. *Amer. Mineral.*, 54, 887–895. (4) Yajima, S. and T. Nakamura (1971) New occurrence of ferrierite. *Mineral. J. (Japan)*, 6, 343–364. (5) Wise, W.S. and Tschernich, R.W. (1976) Chemical composition of ferrierite. *Amer. Mineral.*, 61, 60–66. (6) Gramlich-Meier, R., V. Gramlich, and W.H. Meier (1985) The crystal structure of the monoclinic variety of ferrierite. *Amer. Mineral.*, 70, 619–623. (7) Alberti, A. and C. Sabelli (1987) Statistical and true symmetry of ferrierite (1987) *Zeits. Krist.*, 178, 249–256.