

Fersmite

 $(\text{Ca, Ce, Na})(\text{Nb, Ta, Ti})_2(\text{O, OH, F})_6$

©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Orthorhombic; commonly metamict. *Point Group:* $2/m2/m2/m$. As rough prismatic crystals, slightly elongated along [001], tabular on {010} or {100} and striated parallel to [001]; also acicular, to 15 mm; in intergrowths with columbite and pyrochlore.

Physical Properties: *Cleavage:* {100}, parting. *Fracture:* Subconchoidal.

Tenacity: Extremely brittle. Hardness = 4–4.5 VHN = 572–593 D(meas.) = 4.69–4.80 D(calc.) = 4.78 Fluoresces yellow-green to bluish green under SW and LW UV; light blue cathodoluminescence.

Optical Properties: Opaque, translucent through thin edges. *Color:* Black, dark brown, lemon-yellow to yellow-brown; dark honey-yellow in thin section. *Streak:* Grayish brown.

Luster: Resinous to subvitreous, submetallic.

Optical Class: Biaxial (+). *Pleochroism:* Moderate to weak; $X = Y =$ pale greenish yellow to colorless; $Z =$ dark greenish yellow to olive-yellow. $\alpha = 2.07$ $\beta = [2.08]$ $\gamma = 2.19$ $2V(\text{meas.}) = 20^\circ\text{--}25^\circ$

Cell Data: *Space Group:* Pca_2 (synthetic CaNb_2O_6). $a = 5.752(4)$ $b = 14.926(4)$ $c = 5.204(4)$ $Z = 4$

X-ray Powder Pattern: Ravalli Co., Montana, USA.

3.049 (100), 3.762 (21), 1.527 (15), 2.493 (14), 1.183 (13), 1.211 (11), 1.967 (10)

Chemistry:(1)		(2)		(1)		(2)	
Nb_2O_5	70.12	66.0	RE_2O_3	4.79	Na_2O	0.46	
Ta_2O_5	trace	16.9	Fe_2O_3	1.71	F	1.87	
SiO_2	0.72		FeO		H_2O	0.72	
TiO_2	3.21	0.5	MnO	0.48	$-\text{O} = \text{F}_2$	[0.79]	
Al_2O_3	1.28		MgO	0.98	Total	[100.04]	100.7
Ce_2O_3		0.5	CaO	14.49			
				16.4			

(1) Vishnevyy Mountains, Russia; $\text{RE}_2\text{O}_3 = \text{Ce}_2\text{O}_3$ 80%, Y_2O_3 10%, ThO_2 10%. (2) Orcesco, Italy; by electron microprobe, corresponds to $\text{Ca}_{1.01}(\text{Nb}_{1.72}\text{Ta}_{0.26}\text{Ti}_{0.02})_{\Sigma=2.00}\text{O}_6$.

Occurrence: A rare accessory mineral in nepheline syenites and carbonatites. In miarolitic cavities in an albitized pegmatite dike.

Association: Columbite, pyrochlore, plagioclase, microcline, biotite, apatite, “hornblende”, titanite, muscovite, zircon, xenotime (Vishnevyy Mountains, Russia); columbite, monazite, ancylite, barite, quartz, apatite (Ravalli Co., Montana, USA).

Distribution: Near Lake Buldym, Vishnevyy-Ilmen Mountains, Southern Ural Mountains, Russia. On Alpe Rosso, near Orcesco, Val Vigezzo, Piedmont, Italy. In the USA, from the Dark Star claim, 8 km south of Alta, Ravalli Co., Montana; in the Gem Park ultramafic complex, about six km east of Hillside, Fremont Co., Colorado; from the Mesa Grande and Ramona districts, San Diego Co., California; at the Foote mine, Kings Mountain, Cleveland Co., North Carolina; Granite Mountain, near Little Rock, Pulaski Co., Arkansas. In Canada, at Mt. Brussilof, British Columbia, and at the Huron claim, Greer Lake district, Manitoba. From the Lueshe carbonatite, 150 km north of Goma, Kivu Province, Congo (Zaire). A few other localities are reported.

Name: For Academician Aleksandr Evgen'evich Fersman (1883–1945), eminent Russian mineralogist, geochemist, and gemologist.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 44383, 44384.

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.

References: (1) Bohnstedt-Kupletskaya, E.M. and T.A. Burova (1946) Fersmite, a new calcium niobate from the pegmatites of the Vishnevy Mountains, Central Urals. *Doklady Acad. Nauk SSSR*, 52, 69–71 (in Russian). (2) (1947) *Amer. Mineral.*, 32, 373 (abs. ref. 1). (3) Hess, H.D. and H.J. Trumpour (1959) Second occurrence of fersmite. *Amer. Mineral.*, 44, 1–8. (4) Vlasov, K.A., Ed. (1966) *Mineralogy of rare elements*, v. II, 482–488. (5) Cummings, J.P. and S.H. Simonsen (1970) The crystal structure of calcium niobate (CaNb_2O_6). *Amer. Mineral.*, 55, 90–97. (6) Graeser, S., H. Schwander, and H. Hänni (1979) Vigezzite, $(\text{Ca}, \text{Ce})(\text{Nb}, \text{Ta}, \text{Ti})_2\text{O}_6$, a new aeschynite-type mineral from the Alps. *Mineral. Mag.*, 43, 459–462.