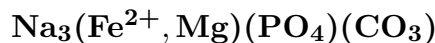


Bonshtedtite



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Crystal Data: Monoclinic, pseudo-orthorhombic. *Point Group:* $2/m$ (probable). As tabular crystals, elongated along [010], with well developed {210}, {101}, {111} faces, to 5 mm; as fine-grained aggregates.

Physical Properties: *Cleavage:* {010}, {100}, perfect. *Tenacity:* Brittle. Hardness = ~ 4 D(meas.) = 2.95–3.16 D(calc.) = 2.95

Optical Properties: Transparent. *Color:* Colorless, with a rose, pale yellow, or pale greenish gray tint; in transmitted light, colorless. *Luster:* Vitreous, pearly on cleavages.

Optical Class: Biaxial (-). *Orientation:* $X = b$; $Y = c$; $Z = a$. $\alpha = 1.520\text{--}1.525$

$\beta = 1.568\text{--}1.570$ $\gamma = 1.591\text{--}1.597$ $2V(\text{meas.}) = 68^\circ$

Cell Data: *Space Group:* $P2_1/m$ (probable). $a = 8.921$ $b = 6.631$ $c = 5.151$
 $\beta = 90^\circ 25'$ $Z = 2$

X-ray Powder Pattern: Vuonnemiok River valley, Russia.
3.318 (100), 2.662 (30), 8.923 (20), 2.578 (20), 2.146 (18), 1.658 (18), 1.851 (15b)

Chemistry:

	(1)	(2)
P ₂ O ₅	26.17	25.80
CO ₂	[16.09]	14.70
SiO ₂		0.43
FeO	16.66	16.80
MnO	1.65	0.30
MgO	2.54	4.61
CaO	0.03	0.26
Na ₂ O	35.34	33.00
K ₂ O	0.03	0.35
LOI		4.33
Total	98.51	100.58

(1) Vuonnemiok River valley, Russia; by electron microprobe, total Fe and Mn as FeO and MnO; giving $\text{Na}_{3.00}(\text{Fe}_{0.63}\text{Mg}_{0.17}\text{Na}_{0.12}\text{Mn}_{0.06})_{\Sigma=0.98}(\text{PO}_4)_{1.01}(\text{CO}_3)_{1.00}$. (2) Kovdor massif, Russia; by electron microprobe, total Fe and Mn as FeO and MnO, contains about 1% each of forsterite and shortite; corresponding to $(\text{Na}_{2.99}\text{K}_{0.02})_{\Sigma=3.01}(\text{Fe}_{0.66}\text{Mg}_{0.28}\text{Mn}_{0.01})_{\Sigma=0.95}(\text{PO}_4)_{1.03}(\text{CO}_3)_{0.91}$.

Occurrence: In veinlets associated with alkali-carbonate metasomatism of alkalic massifs.

Association: Shortite, thermonatrite, eitelite, neighborite, trona, burbankite, barentsite, siderite, aegirine.

Distribution: Found in drill core from the Vuonnemiok River valley, and on Mts. Suoluaiv, Kukisvumchorr, Partomchorr, and Restin'yun, Khibiny massif, also in drill core from the Kovdor massif, Kola Peninsula, Russia.

Name: To honor Elsa Maksimilianovna Bonshtedt-Kupletskaia (1897–1974), Russian specialist in mineralogy of alkalic massifs.

Type Material: Mining Institute, St. Petersburg, 1198/1; Geology Museum, Kola Branch, Academy of Sciences, Apatity, 5713/5, 5723/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 81589.

References: (1) Khomyakov, A.P., V.V. Aleksandrov, N.I. Krasnova, V.V. Ermilov, and N.N. Smol'yaninova (1982) Bonshtedtite, $\text{Na}_3\text{Fe}(\text{PO}_4)(\text{CO}_3)$, a new mineral. *Zap. Vses. Mineral. Obshch.*, 111, 486–490 (in Russian). (2) (1983) *Amer. Mineral.*, 68, 1038 (abs. ref. 1). (3) Thi, T.T.L., T.N. Pobedimskaya, T.N. Nadezhina, and A.P. Khomyakov (1984) The crystal structures of alkaline carbonates: barentsite, bonshtedtite and donnayite. *Acta Cryst.*, C40, supplement, C257 (abs.).

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