Natanite $Fe^{2+}Sn^{4+}(OH)_6$

Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. Crystals, to 3 mm, in irregular aggregates; massive.

Physical Properties: Hardness = 4.7 VHN = 315 D(meas.) = n.d. D(calc.) = 4.035

Optical Properties: Semitransparent. *Color:* Greenish brown; dark gray in reflected light.
Luster: Vitreous.
Optical Class: Isotropic. $n = 1.755$

Cell Data: *Space Group:* $Pn3m$. a = 7.69(1) Z = 4

X-ray Powder Pattern: Mushiston deposit, Tajikistan.
1.710 (10), 3.729 (9), 1.563 (7.5), 2.709 (7), 2.221 (5), 1.031 (4), 1.920 (3)

Chemistry:

	(1)	(2)
Sn	43.6	42.92
Fe	19.8	20.19
OH	36.3	36.89
Total	99.7	100.00

(1) Mushiston deposit, Tajikistan; by electron microprobe, average of three analyses; corresponding to $Fe_{0.99}Sn_{1.03}(OH)_{5.98}$. (2) $FeSn(OH)_6$.

Mineral Group: Schoenfliesite group.

Occurrence: Formed by oxidation of earlier tin sulfides in tin deposits.

Association: Stannite, vismirnovite, malachite, azurite, goethite (Mushiston deposit, Tajikistan); hocartite (Chat-Karagai deposit, Russia); nevskite, wolframite, cassiterite, laitakarite, guanajuatite (Nevskoye deposit, Russia); ilvaite, fluorite, jeanbandyite, pyrrhotite, siderite, quartz (Santa Eulalia, Mexico).

Distribution: In the Trudov tin deposit, Sarydzhaz Range, near Inyl'chek, and in the Chat-Karagai tin deposit, Tallas Alatan, Kyrgyzstan. From the Mushiston tin deposit, Kaznok Valley, Zeravshan Range, Tajikistan. In the Nevskoye W–Sn deposit, 25 km northwest of Omsukchan, Magadan region, Russia. In the El Potosi and San Antonio mines, Santa Eulalia, Chihuahua, Mexico. From Llallagua, Bolivia.

Name: Honors Professor Natan (Antolii) Il'ich Ginzburg (1917–1984), mineralogist and geologist, All-Union Research Institute of Mineral Resources, Moscow, Russia, student of oxidized tin deposits.

Type Material: Mining Institute, St. Petersburg, 1988/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 81651.

References: (1) Marshukova, N.K., A.B. Palovskii, G.A. Sidorenko, and N.I. Chistyakova (1981) Vismirnovite, $ZnSn(OH)_6$, and natanite, $FeSn(OH)_6$, new tin minerals. Zap. Vses. Mineral. Obshch., 110, 492–500 (in Russian). (2) (1982) Amer. Mineral., 67, 1077 (abs. ref. 1). (3) (1982) Mineral. Abs., 33, 170 (abs. ref. 1).