Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As platy crystals and deformed aggrerates to 5 cm.

Physical Properties: Very similar in appearance to astrophyllite. *Cleavage*: Perfect on {001}, good on {010}, imperfect on {100}. *Tenacity*: Brittle. *Fracture*: n.d. Hardness = 3 VHN = 170-218 (20 g load). D(meas.) = 3.32(2) D(calc.) = 3.347

Optical Properties: Transparent. *Color*: Brown with a bronze hue. *Streak*: Pale yellow. *Luster*: Vitreous.
Optical Class: Biaxial (+). α =1.703(2) β = 1.716(2) γ = 1.745(2) 2V(meas.) = 68(2)° 2V(calc.) = 68.6° *Dispersion*: Strong, $r > v$. *Pleochroism*: X = intense brown, Y = reddish brown, Z = light yellowish brown. *Absorption*: $X > Z > Y$.

Cell Data: Space Group: $P\bar{1}$. a = 5.374(3) b = 11.948(5) c = 11.676(5) α = 113.360(6)° β = 94.538(8)° γ = 103.01(1)° Z = 1

X-ray Powder Pattern: Darai-Pioz alkaline massif, Tajikistan.
10.56 (100), 3.50 (100), 2.780 (80), 2.578 (70), 2.648 (45), 2.106 (35), 2.295 (30)

Chemistry:	(1)		(1)		(1)
SiO_2	36.11	ZnO	0.23	ZrO_2	1.47
Al_2O_3	0.58	PbO	0.39	SnO_2	0.89
Na_2O	1.88	FeO	30.84	F	1.45
K_2O	2.68	MnO	4.86	Li_2O	1.30
Cs_2O	0.93	TiO_2	9.48	$-O = F_2$	0.61
CaO	1.24	Nb_2O_5	2.40	H_2O	[4.32]
MgO	0.11	Ta_2O_5	0.61	Total	101.27

(1) Darai-Pioz alkaline massif, Tajikistan; average electron microprobe analysis supplemented by FTIR and atomic absorption spectroscopy, H_2O from structure; corresponds to
$(Li_{1.14}K_{0.75}Cs_{0.09}Pb_{0.02})_{\Sigma=2.00}(Na_{0.71}Ca_{0.29})_{\Sigma=1.00}(Fe^{2+}_{5.62}Mn_{0.90}Zr_{0.08}Na_{0.08}Mg_{0.04}Zn_{0.04})_{\Sigma=6.76}$
$(Ti_{1.56}Nb_{0.24}Sn_{0.09}Zr_{0.08}Ta_{0.04})_{\Sigma=2.00}[(Si_{7.86}Al_{0.15})_{\Sigma=8.01}O_{24}]O_2(OH)_4F_{1.00}[(H_2O)_{1.14}\square_{0.86}]_{\Sigma=2.00}$.

Mineral Group: Astrophyllite supergroup, astrophyllite group.

Occurrence: In fenitized amphibole-quartz-feldspar rock from a complex alkaline massif.

Association: Alkali amphibole, quartz, microcline, bafertisite, aegirine, calcybeborosilite-(Y), thorite, fluorite, zircon, uraniferous pyrochlore, stillwellite-(Ce), thorite, Nb-bearing titanite.

Distribution: From the moraine of the Darai-Pioz glacier, upper reaches of the Darai-Pioz River, in the region of the Turkestan, Zeravshan, and Alay Ranges, Tajikistan.

Name: Honors Dmitry Vasiljevich Nalivkin (1889-1982), participant of the Pamiro-Tadjik expedition (1920-1930) and author on the geology, stratigraphy and paleontology of Central Asia.

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

References: (1) Agakhanov, A.A., L.A. Pautov, E. Sokolova, Y.A. Abdu, and V.Y. Karpenko (2016) Two astrophyllite-supergroup minerals: bulgakite, a new mineral from the Darai-Pioz alkaline massif, Tajikistan and revision of the crystal structure and chemical formula of nalivkinite. Can. Mineral., 54(1), 33-48. (2) (2017) Amer. Mineral., 102, 1143 (abs. ref. 1).
(3) Agakhaonv, A.A., L.A. Pautov, Y.A. Uvarova, E. Sokolova, F.C. Hawthorne, and V.Y. Karpenko, (2008) Nalivkinite, $Li_2NaFe^{2+}_7Ti_2(Si_8O_{24})O_2(OH)_4F$, a new mineral of the astrophyllite group from the Darai-Pioz massif, Tadjikistan. New Data on Minerals, 43, 5-12.