Ilirneyite $Mg_{0.5}[ZnMn^{3+}(TeO_3)_3]\cdot 4.5H_2O$

Crystal Data: Hexagonal. *Point Group*: 6/*m*. As interrupted earthy films to 2.5 cm. Rarely as well-terminated prismatic hexagonal crystals to 0.15 mm, displaying {10*0} and {10*1}; in sprays or open-work chaotic groups to 0.03 mm. As moss-like, friable aggregates of acicular crystals.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle.
Hardness = ~3 VHN = 122-142, 132 average (20 g load). D(meas.) = n.d. D(calc.) = 4.205

Optical Properties: Transparent to translucent. *Color*: Reddish brown to dark brownish red, brown to light brown in moss-like aggregates; dark gray in reflected light with distinct red-brown internal reflections. *Streak*: Brown. *Luster*: Adamantine to semi-metallic (crystals); silky (aggregates). *Optical Class*: n.d. *Anisotropism*: Weak, brownish to greenish tints. Weakly bireflectant. R_1-R_2: (400) 7.1-8.2, (420) 7.7-8.8, (440) 7.9-9.1, (460) 7.8-9.0, (470) 7.8-9.0, (480) 7.7-8.9, (500) 7.6-8.8, (520) 7.5-8.8, (540) 7.4-8.7, (546) 7.3-8.7, (560) 7.3-8.6, (580) 7.2-8.6, (589) 7.2-8.6, (600) 7.2-8.5, (620) 7.1-8.5, (640) 7.1-8.4, (650) 7.1-8.4, (660) 7.0-8.3, (680) 7.0-8.2, (700) 6.9-8.2

Cell Data: Space Group: $P6_3/m$. $a = 9.423(1)$ $c = 7.669(1)$ Z = 2

X-ray Powder Pattern: Sentyabr'skoe deposit, Ilirney ore district, Western Chukotka, Russia. 8.18 (100), 4.088 (61), 2.796 (52), 2.864 (24), 2.977 (16), 3.087 (15), 3.847 (14)

Chemistry:

	(1)	(2)
CuO	0.58	
MgO	4.20	2.72
ZnO	11.42	10.99
MnO	[1.25]	
Mn_2O_3	[7.14]	10.66
Fe_2O_3	0.06	
TeO_2	65.06	64.68
H_2O	[11.01]	10.95
Total	100.72	100.00

(1) Sentyabr'skoe deposit, Ilirney ore district, Western Chukotka, Russia; average of 9 electron microprobe analyses, MnO and Mn_2O_3 apportioned for charge balance from total Mn as Mn_2O_3 = 8.54, H_2O calculated from stoichiometry; corresponds to $Mg_{0.77}Mn^{2+}_{0.13}Cu_{0.05}Zn_{1.03}Mn^{3+}_{0.67}Fe^{3+}_{0.01}Te^{4+}_3O_9\cdot 4.5H_2O$. (2) $Mg_{0.5}[ZnMn^{3+}(TeO_3)_3]\cdot 4.5H_2O$.

Occurrence: In the oxidation zone of sulfide-telluride-bearing quartz veins in cracks and cavities.

Association: Gypsum, malachite, azurite, cerussite, anglesite, brochantite, linarite, posnjakite, chlorargyrite, acanthite, gold, goethite, coronadite, paratellurite, raisaite, xocomecatlite.

Distribution: From the Sentyabr'skoe gold-silver deposit, Ilirney ore district, 110 km east southeast of Bilibino, Western Chukotka, North-Eastern Region, Russia.

Name: For the locality that produced the first specimen, the *Ilirney* ore district, near the village of *Ilirney*, the *Ilirney* Lakes and *Ilirney*veem River, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (95277).

References: (1) Pekov, I.V., O.I. Siidra, E.A. Vlasov, V.O. Yapaskurt, Yu.S. Polekhovsky, and A.V. Apletalin (2018) Ilirneyite, $Mg_{0.5}[ZnMn^{3+}(TeO_3)_3]\cdot 4.5H_2O$, a new mineral from Chukotka, Russia. Can. Mineral., 56 (6), 913-921. (2) (2020) Amer. Mineral., 105, 1112 (abs. ref. 1).