Ferricoronadite $Pb[Mn^{4+}_6(Fe^{3+},Mn^{3+})_2]O_{16}$

Crystal Data: Tetragonal. *Point Group*: 4/*m*. As aggregates of anhedral grains to 0.6 mm.

Physical Properties: *Cleavage*: Distinct on {100}. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = ~ 6 VHN = 819 (754-858) (150 g load). D(meas.) = n.d. D(calc.) = 5.538

Optical Properties: Opaque. *Color*: Black; light gray in reflected light. *Streak*: Brownish black. *Luster*: Submetallic to metallic.
Optical Class: n.d. Anisotropic.
R_1-R_2: (470) 28.7-27.8, (546) 27.6-26.6, (589) 27.2-26.1, (650) 26.5-25.4

Cell Data: *Space Group*: *I*4/*m*. *a* = 9.9043(7) *c* = 2.8986(9) Z = 1

X-ray Powder Pattern: Babuna River valley, near Nežilovo village, Republic of Macedonia. 3.128 (100), 3.497 (33), 2.424 (27), 2.214 (23), 1.554 (18), 2.178 (17), 1.651 (16)

Chemistry:	(1)
BaO	5.16
PbO	24.50
ZnO	0.33
Al_2O_3	0.50
Fe_2O_3	11.45
TiO_2	4.19
MnO_2	44.81
Mn_2O_3	9.90
Total	100.84

(1) Babuna River valley, near Nežilovo village, Republic of Macedonia; average of 5 electron microprobe analyses supplemented by IR, XANES and Mössbauer spectroscopy, Mn^{4+}:Mn^{3+} adjusted for charge balance; corresponds to $Pb_{1.03}Ba_{0.32}(Mn^{4+}_{4.85}Fe^{3+}_{1.35}Mn^{3+}_{1.18}Ti_{0.49}Al_{0.09}Zn_{0.04})_{\Sigma=8.00}O_{16}$.

Mineral Group: Hollandite supergroup, coronadite group.

Occurrence: In hydrothermal veins that cut metamorphic rocks in an orogenic complex.

Association: Franklinite (relics), gahnite, quartz, roméite, almeidaite, Mn-analogue of plumboferrite, zincohögbomite analog with Fe^{3+} > Al, zincochromite, Zn-bearing talc, Zn-bearing muscovite, barite, zircon.

Distribution: Found in the Babuna River valley, in talus at the bottom of Kalugeri Hill, near Nežilovo village, about 40 km SW of Veles, Republic of Macedonia.

Name: For a member of the coronadite group with Fe^{3+} as the major charge-compensating octahedral cation instead of Mn^{3+}.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4787/1) and the National Institution Macedonian Museum of Natural History, Skopje, Macedonia (PNMG 790).

References: (1) Chukanov, N.V., S.M. Aksenov, S. Jančev, I.V. Pekov, J. Göttlicher, Y.S. Polekhovsky, V.S. Rusakov, Y.V. Nelyubina, and K.V. Van (2016) A new mineral species ferricoronadite, $Pb[Mn^{4+}_6(Fe^{3+},Mn^{3+})_2]O_{16}$: mineralogical characterization, crystal chemistry and physical properties. Physics and Chemistry of Minerals, 43(7), 503-514. (2) (2018) Amer. Mineral., 103, 2525 (abs. ref. 1).