Ivanyukite-Cu $Cu[Ti_4O_2(OH)_2(SiO_4)_3]\cdot 7H_2O$

Crystal Data: Cubic. *Point Group*: $\bar{4}3m$. As cubic crystals to 1.5 mm. *Twinning*: None observed.

Physical Properties: *Cleavage*: Perfect on {100}. *Tenacity*: Brittle. *Fracture*: Stepped.
Hardness = ~4 D(meas.) = 2.70 D(calc.) = 2.46

Optical Properties: Translucent. *Color*: Bright green; colorless in thin section. *Streak*: Pale green. *Luster*: Vitreous.
Optical Class: Isotropic. $n = 1.73(1)$

Cell Data: *Space Group*: $P\bar{4}3m$. 7.850(7) Z = 1

X-ray Powder Pattern: Koashva Quarry, Khibiny Massif, Kola Peninsula, Russia.
7.87 (100), 3.205 (80), 2.616 (30), 2.481 (30), 1.960 (30), 1.843 (30), 3.94 (20)

Chemistry:

	(1)
Na_2O	0.17
Al_2O_3	0.07
SiO_2	24.80
K_2O	2.80
CaO	0.23
TiO_2	38.36
MnO	0.28
FeO	0.73
CuO	6.81
Nb_2O_5	3.02
H_2O	21.50
Total	98.97

(1) Koashva Quarry, Khibiny Massif, Kola Peninsula, Russia; average electron microprobe analysis supplemented by IR spectroscopy, H_2O by the Penfield method; corresponding to $(Cu_{0.62}K_{0.43}Na_{0.40}Ca_{0.03})_{\Sigma=1.12}[(Ti_{3.48}Nb_{0.16}Fe_{0.07}Mn_{0.03})_{\Sigma=3.74}(Si_{2.99}Al_{0.01})_{\Sigma=3.00}O_{12.88}(OH)_{2.88}]\cdot 7.21H_2O$.

Mineral Group: Pharmacosiderite supergroup, ivanyukite group.

Occurrence: A late-stage, hydrothermal phase in natrolitized microcline-aegirine-sodalite lens in orthoclase-bearing urtite.

Association: Microcline, vinogradovite, sazykinaite-(Y), natrolite, djerfisherite, chalcopyrite, chalcocite.

Distribution: From the Koashva Quarry, Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia.

Name: Honors Gregory Yur'evich *Ivanyuk*, Russian mineralogist and petrologist, head of the Laboratory of Self-Organized Mineral Systems, Geological Institute, Kola Science Center, Russian Academy of Sciences, for his contributions to the petrology and mineralogy of banded iron-formations, and alkaline and alkaline-ultrabasic massifs. The suffix indicates the dominant extra-framework cation, *Cu*.

Type Material: Geological and Mineralogical Museum, Geological Institute, Kola Science Center, Russian Academy of Sciences, Apatity, Russia (6354).

References: (1) Yakovenchuk, V.N., A.P. Nikolaev, E.A. Selivanova, Y.A. Pakhomovsky, J.A. Korchak, D.V. Spiridonova, O.A. Zalkind, and S.V. Krivovichev (2009) Ivanyukite-Na-*T*, ivanyukite-Na-*C*, ivanyukite-K, and ivanyukite-Cu: New microporous titanosilicates from the Khibiny massif (Kola Peninsula, Russia) and crystal structure of ivanyukite-Na-*T*. Amer. Mineral., 94, 1450-1458.