Juonniite $CaMgSc(PO_4)_2(OH)\cdot 4H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Platy crystals, subparallel, curved, to 12 μm, in spherulites.

Physical Properties: Hardness = 4–4.5 VHN = 315–355, 330 average (20 g load). D(meas.) = 2.43(3) D(calc.) = 2.44

Optical Properties: Translucent. *Color:* Bright orange, pale yellow, yellowish brown, gray, colorless. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial (–). $\alpha = 1.574(1)$ $\beta = 1.579(1)$ $\gamma = 1.582(2)$ 2V(meas.) = n.d. 2V(calc.) = 70.2°

Cell Data: *Space Group:* [*Pbca*] (by analogy to overite). $a = 15.03(5)$ $b = 18.95(4)$ $c = 7.59(1)$ Z = 8

X-ray Powder Pattern: Kovdor massif, Kola Peninsula, Russia.
9.49 (100), 2.912 (44), 2.890 (35), 3.440 (31), 2.942 (27), 4.75 (17), 2.018 (15)

Chemistry:

	(1)	(2)
P_2O_5	36.16	36.55
TiO_2	0.38	
Sc_2O_3	13.17	17.76
FeO	1.07	
MnO	1.28	
MgO	12.08	10.38
CaO	12.33	14.44
SrO	0.53	
BaO	1.58	
H_2O	[21.42]	20.87
Total	[100.00]	100.00

(1) Kovdor massif, Kola Peninsula, Russia; by electron microprobe, average of nine analyses, total Fe as FeO, total Mn as MnO, H_2O by difference; PO_4, $(OH)^{1-}$, H_2O confirmed by IR; corresponds to $(Ca_{0.86}Mn_{0.07}Ba_{0.04}Sr_{0.02})_{\Sigma=0.99}Mg_{1.00}(Sc_{0.75}Mg_{0.18}Fe_{0.05}Ti_{0.02})_{\Sigma=1.00}(PO_4)_2(OH)_{0.83}\cdot 4.25H_2O$. (2) $CaMgSc(PO_4)_2(OH)\cdot 4H_2O$.

Occurrence: A rare mineral in cavities and contacts with ore minerals in a metasomatized carbonatite stockwork.

Association: Dolomite, magnesite, bobierrite, kovdorskite, manasseite, hydrotalcite, apatite, strontiowhitlockite, pyrite, strontian collinsite, rimkorolgite, talc, baddeleyite, zircon, gypsum.

Distribution: From the Zheleznyi iron mine, Kovdor alkalic massif, Kola Peninsula, Russia.

Name: From the Finnish name (Juonni) for the Yona River, in allusion to the locality of first occurrence of the species.

Type Material: St. Petersburg Mining Institute, St. Petersburg, Russia.

References: (1) Liferovich, R.P., V.N. Yakovenchuk, Y.A. Pakhomovskii, A.N. Bogdanova, and S.N. Britvin (1997) Juonniite, a new scandium mineral from calcite-dolomite carbonatites of the Kovdor massif. Zap. Vses. Mineral. Obshch., 126(4), 80–88 (in Russian with English abs.). (2) (1998) Amer. Mineral., 83, 908 (abs. ref. 1).