Karchevskyite $Mg_{18}Al_9(OH)_{54}Sr_2(CO_3,PO_4)_9(H_2O,H_3O)_{11}$

Crystal Data: Hexagonal. *Point Group*: n.d. As thin bent plates; as spherulites, to 1.5 mm.

Physical Properties: *Cleavage*: Perfect on {001}. *Fracture*: n.d. *Tenacity*: Flexible. Hardness = 2 D(meas.) = 2.21(2) D(calc.) = 2.18(1)

Optical Properties: Transparent. *Color*: Colorless; white in aggregates.
Luster: Vitreous, pearly on cleavage surfaces.
Optical Class: Uniaxial (-). $\omega = 1.542(2)$ $\varepsilon = 1.534(2)$ Anomalously biaxial, with 2V = 20°.

Cell Data: *Space Group*: $P\bar{3}$, $P3$, $P\bar{3}1m$, $P31m$, $P\bar{3}m1$, $P3m1$, $P312$, or $P321$.
$a = 16.055(6)$ $c = 25.66(1)$ $Z = 3$

X-ray Powder Pattern: Zhelezny open-pit mine, Kovdor massif, Kola Peninsula, Russia.
8.52 (100), 3.665 (90), 3.547 (90), 4.27 (60), 3.081 (60), 6.41 (40), 5.13 (30)

Chemistry:

	(1)
Al_2O_3	18.3
MgO	29.7
CaO	0.2
SrO	7.4
P_2O_5	1.3
CO_2	14.5
H_2O	28.6
Total	100.0

(1) Zhelezny open-pit mine, Kovdor carbonatite massif, Kola Peninsula, Russia; average of 10 electron microprobe analyses, H_2O by difference, IR confirms OH, CO_3, H_3O and H_2O, corresponding to $Mg_{18.00}Al_{9.00}(OH)_{54}(Sr_{1.79}Mg_{0.48}Ca_{0.09})_{\Sigma=2.36}(CO_3)_{8.26}(PO_4)_{0.46}(H_2O)_{6.34}(H_3O)_{4.18}$.

Occurrence: A late-stage hydrothermal mineral, finely intergrown with quintinite-3T, in cavities in dolomite in a carbonatite complex.

Association: Dolomite, magnetite, quintinite-3T, strontium carbonate-fluorapatite.

Distribution: Zhelezny open-pit mine, Kovdor carbonatite massif, Kola Peninsula, Russia.

Name: Honors Russian mineralogist Pavel Karchevsky (1976–2002) for significant contributions to the study of carbonatites.

Type Material: Mineralogical Museum, St. Petersburg State University, and at the A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia.

References: (1) Britvin, S.N., N.V. Chukanov, G.K. Bekenova, M.A. Yagovkina, A.V. Antonov, A.N. Bogdanova, and N.I. Krasnova (2007) Karchevskyite, $[Mg_{18}Al_9(OH)_{54}][Sr_2(CO_3,PO_4)_9(H_2O,H_3O)_{11}]$, a new mineral species of the layered double hydroxide family. Zap. Ross. Mineral. Obshch., 136(5), 20–23 (in Russian, English abstract), Geol. Ore Deposits, 50, 556–564 (2008; in English). (2) (2010) Amer. Mineral., 95, 1598-1599 (abs. ref. 1).