

**Karchevskyite****Mg<sub>18</sub>Al<sub>9</sub>(OH)<sub>54</sub>Sr<sub>2</sub>(CO<sub>3</sub>,PO<sub>4</sub>)<sub>9</sub>(H<sub>2</sub>O,H<sub>3</sub>O)<sub>11</sub>**

**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  $2V = 20^\circ$ .

**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 <sub>2</sub> O <sub>3</sub>	18.3
MgO	29.7
CaO	0.2
SrO	7.4
P <sub>2</sub> O <sub>5</sub>	1.3
CO <sub>2</sub>	14.5
<u>H<sub>2</sub>O</u>	<u>28.6</u>
Total	100.0

(1) Zhelezny open-pit mine, Kovdor carbonatite massif, Kola Peninsula, Russia; average of 10 electron microprobe analyses, H<sub>2</sub>O by difference, IR confirms OH, CO<sub>3</sub>, H<sub>3</sub>O and H<sub>2</sub>O, corresponding to Mg<sub>18.00</sub>Al<sub>9.00</sub>(OH)<sub>54</sub>(Sr<sub>1.79</sub>Mg<sub>0.48</sub>Ca<sub>0.09</sub>) $\Sigma=2.36$ (CO<sub>3</sub>)<sub>8.26</sub>(PO<sub>4</sub>)<sub>0.46</sub>(H<sub>2</sub>O)<sub>6.34</sub>(H<sub>3</sub>O)<sub>4.18</sub>.

**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<sub>18</sub>Al<sub>9</sub>(OH)<sub>54</sub>][Sr<sub>2</sub>(CO<sub>3</sub>,PO<sub>4</sub>)<sub>9</sub>(H<sub>2</sub>O,H<sub>3</sub>O)<sub>11</sub>], a new mineral species of the layered double hydroxide family. *Zap. Ross. Mineral. Obsch.*, 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).