

**Polyakovite-(Ce)****(Ce, Ca)<sub>4</sub>MgCr<sub>2</sub>(Ti, Nb)<sub>2</sub>Si<sub>4</sub>O<sub>22</sub>**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As equant grains, to 2.5 cm, and as euhedral crystals, elongate along [010] and flattened on {001}, to 2 mm, showing ten forms; almost identical to the forms of chevkinite.

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 5.5-6 VNH = 75-987, 874 (200 g load). D(meas.) = 4.75(7) D(calc.) = 5.05 Highly metamict.

**Optical Properties:** Translucent in thin fragments. *Color:* Black, gray in reflected light.

*Streak:* Light brown. *Luster:* Vitreous.

*Optical Class:* Isotropic.  $1.931 < n < 1.935$

R: (460) 11.3, (540) 10.9, (580) 10.8, (660) 10.2

**Cell Data:** *Space Group:* C2/m.  $a = 13.398(1)$   $b = 5.6974(5)$   $c = 11.042(2)$   $\beta = 100.539(2)^\circ$   $Z = 2$

**X-ray Powder Pattern:** N97 mine, Ilmen Natural Reserve, southern Urals, Russia. (annealed) 2.715 (100), 3.18 (50), 2.160 (45), 5.44 (40), 3.15 (40), 2.849 (40), 3.62 (35)

Chemistry:	(1)		(1)
SiO <sub>2</sub>	19.08	UO <sub>2</sub>	0.03
TiO <sub>2</sub>	9.49	Y <sub>2</sub> O <sub>3</sub>	0.38
FeO	[1.09]	Ce <sub>2</sub> O <sub>3</sub>	24.24
Fe <sub>2</sub> O <sub>3</sub>	[4.30]	La <sub>2</sub> O <sub>3</sub>	15.94
MnO	0.05	Nd <sub>2</sub> O <sub>3</sub>	4.76
MgO	2.61	Pr <sub>2</sub> O <sub>3</sub>	2.01
CaO	1.06	Sm <sub>2</sub> O <sub>3</sub>	0.38
Cr <sub>2</sub> O <sub>3</sub>	7.42	<u>H<sub>2</sub>O</u>	<u>0.14</u>
Nb <sub>2</sub> O <sub>5</sub>	3.98	Total	99.75
ThO <sub>2</sub>	2.79		

(1) The N97 mine, Ilmen Natural Reserve, southern Urals, Russia; average electron microprobe and wet chemical analyses supplemented by IR spectroscopy, FeO and Fe<sub>2</sub>O<sub>3</sub> partitioned by Mössbauer spectroscopy; corresponding to (Ce<sub>1.86</sub>La<sub>1.23</sub>Nd<sub>0.35</sub>Pr<sub>0.15</sub>Sm<sub>0.01</sub>Y<sub>0.04</sub>Ca<sub>0.24</sub>Th<sub>0.12</sub>) $\Sigma=4.00$ (Mg<sub>0.80</sub>Fe<sup>2+</sup><sub>0.20</sub>Mn<sup>2+</sup><sub>0.01</sub>) $\Sigma=1.02$ (Cr<sup>3+</sup><sub>1.28</sub>Fe<sup>3+</sup><sub>0.72</sub>) $\Sigma=2.00$ (Ti<sub>1.52</sub>Nb<sub>0.32</sub>□<sub>0.16</sub>) $\Sigma=2.00$ Si<sub>4</sub>O<sub>22</sub>.

**Mineral Group:** Chevkinite group, chevkinite subgroup.

**Occurrence:** In a carbonatite vein cutting phlogopite-fluororichterite rock.

**Association:** Calcite, dolomite, fluororichterite, phlogopite, forsterite, monazite-(Ce), clinohumite, chromite, thorianite.

**Distribution:** From the N97 mine, Ilmen Natural Reserve, southern Urals, Russia.

**Name:** Honors mineralogist Vladislav O. *Polyakov* (1950-1993), who began this investigation.

**Type Material:** Museum of the Ilmen Natural Reserve at Miass, and the A.E. Fersman Mineralogical Museum, Moscow, Russia.

**References:** (1) Popov, V.A., L.A. Pautov, E. Sokolova, F.C. Hawthorne, C. McCammon, and L.F. Bazhenova (2001) Polyakovite-(Ce), (REE,Ca)<sub>4</sub>(Mg,Fe<sup>2+</sup>)(Cr<sup>3+</sup>,Fe<sup>3+</sup>)<sub>2</sub>(Ti,Nb)<sub>2</sub>Si<sub>4</sub>O<sub>22</sub>, a new metamict mineral species from the Ilmen Mountains, southern Urals, Russia: mineral description and crystal chemistry. *Can. Mineral.*, 39, 1095-1104. (2) (2002) *Amer. Mineral.*, 87, 766-767 (abs. ref. 1).