

**Kapustinite****Na<sub>5.5</sub>Mn<sub>0.25</sub>ZrSi<sub>6</sub>O<sub>16</sub>(OH)<sub>2</sub>**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As equant grains to 4 cm; in clusters to 8 cm.

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle.  
Hardness = 6 D(meas.) = 2.78(1) D(calc.) = 2.815

**Optical Properties:** Transparent to translucent. *Color:* Dark cherry-red. *Streak:* Pale lilac.  
*Luster:* Vitreous.  
*Optical Class:* Biaxial (-).  $\alpha = 1.585(2)$   $\beta = \gamma = 1.589(2)$   $2V(\text{meas}) = <5^\circ$   $2V(\text{calc}) = 0^\circ$   
*Dispersion:* None. *Pleochroism:* None.

**Cell Data:** *Space Group:* C2/m.  $a = 10.693(4)$   $b = 10.299(4)$   $c = 7.373(4)$   $\beta = 91.91(5)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Kedykverpakhk Mountain, Kola Peninsula, Russia.  
2.651 (100), 3.270 (92), 2.580 (91), 3.342 (84), 5.313 (51), 3.690 (43), 1.849 (39)

<b>Chemistry:</b>	(1)		(1)
Na <sub>2</sub> O	24.42	Ce <sub>2</sub> O <sub>3</sub>	0.20
K <sub>2</sub> O	0.02	Nd <sub>2</sub> O <sub>3</sub>	0.24
MgO	0.02	SiO <sub>2</sub>	52.82
CaO	0.18	TiO <sub>2</sub>	0.54
MnO	2.36	ZrO <sub>2</sub>	16.38
ZnO	0.05	UO <sub>2</sub>	0.28
Fe <sub>2</sub> O <sub>3</sub>	0.36	<u>H<sub>2</sub>O</u>	<u>2.80</u>
Y <sub>2</sub> O <sub>3</sub>	0.17	Total	100.84

(1) Kedykverpakhk Mountain, Kola Peninsula, Russia; electron microprobe analysis, H<sub>2</sub>O by Penfield method, corresponding to Na<sub>5.38</sub>Y<sub>0.01</sub>Ce<sub>0.01</sub>Nd<sub>0.01</sub>U<sub>0.01</sub>Ca<sub>0.02</sub>Mn<sub>0.23</sub>Fe<sub>0.03</sub>Ti<sub>0.05</sub>Zr<sub>0.91</sub>Si<sub>6</sub>O<sub>15.91</sub>(OH)<sub>2.12</sub>.

**Mineral Group:** Lovozerite group, zirsinalite-lovozerite subgroup.

**Occurrence:** In hyperagpaitic pegmatite in an alkaline massif.

**Association:** Microcline, aegirine, kazakovite, ussingite, sodalite, analcime, natrosilite, villiaumite.

**Distribution:** From the Palitra pegmatite, Kedykverpakhk Mountain, Lovozero alkaline massif, Kola Peninsula, Russia.

**Name:** Honors mineralogist Yu. L. Kapustin (1933–2002), who extensively studied alkaline massifs.

**Type Material:** A.E. Fersman Mineralogical Museum, Moscow, Russia.

**References:** (1) Pekov, I.V., N.V. Chukanov, N.A. Yamnova, Yu.K. Egorov-Tismenko, and A.E. Zadov (2003) Kapustinite, Na<sub>5.5</sub>Mn<sub>0.25</sub>ZrSi<sub>6</sub>O<sub>16</sub>(OH)<sub>2</sub>, a new mineral from the Lovozero massif (Kola Peninsula) and new data on the genetic crystallochemistry of the Lovozerite group. *Zapiski Vseross. Mineral. Obshch.*, 132(6), 1–14 (in Russian, English abs.). (2) Yamnova, N.A., Yu.K. Egorov-Tismenko, I.V. Pekov, and L.V. Shchegol'kova (2004) Crystal structure of kapustinite Na<sub>5.5</sub>Mn<sub>0.25</sub>Zr[Si<sub>6</sub>O<sub>16</sub>(OH)<sub>2</sub>], a new mineral of the lovozerite group. *Doklady Akad. Nauk*, 396, 680–685 (in Russian). (3) (2005) *Amer. Mineral.*, 90, 271–272 (abs. refs. 1& 2). (4) Pekov, I.V., S.V. Krivovichev, A.A. Zolotarev, V.N. Yakovenchuk, T. Armbruster and Y.A. Pakhomovsky (2009) Crystal chemistry and nomenclature of the lovozerite group. *Eur. J. Mineral.*, 21, 1061–1071.