Mariinskite $(Cr,Al)_2BeO_4$

Crystal Data: Orthorhombic. *Point Group*: 222. As irregular grains to 0.3 mm. *Twinning*: As pseudohexagonal chrysoberyl-type twins.

Physical Properties: *Cleavage*: n.d. *Fracture*: Conchoidal. *Tenacity*: n.d. Hardness = 8.5 VHN = 1725 (150 g load). D(meas.) = 4.25(2) D(calc.) = 4.25

Optical Properties: Translucent. *Color*: Dark green, emerald green in transmitted light; in reflected light, gray with green reflections. *Streak*: Pale green. *Luster*: Vitreous. *Optical Class*: Biaxial (+). $\alpha = 2.05$ (1) $\beta = 2.09$ (3) $\gamma = 2.15$ (1) 2V(meas.) = 80(10)° 2V(calc.) = 80.5° *Pleochroism*: Strong, Z = emerald-green, Y = yellow-green, X = greenish yellow. *Absorption*: $Z > Y > X$. *Bireflectance*: Very weak. *Anisotropism*: Weak. R_1-R_2: (589) 12.3-12.9

Cell Data: *Space Group*: $P2_12_12_1$. $a = 4.487(1)$ $b = 5.629(1)$ $c = 9.732(2)$ $Z = 4$

X-ray Powder Pattern: Mariinskoye Be deposit, Ural Emerald Mines, Middle Urals, Russia. 1.651 (100), 3.31 (90), 2.139 (60), 2.629 (50), 2.434 (50), 4.08 (40), 2.381 (40)

Chemistry:

	(1)
BeO	16.3
Al_2O_3	23.89
Cr_2O_3	58.67
Fe_2O_3	0.26
V_2O_3	0.26
TiO2	0.61
Total	99.98

(1) Mariinskoye Be deposit, Ural Emerald Mines, Middle Urals, Russia; average of 92 electron microprobe analyses, BeO_4 confirmed by IR spectroscopy; corresponding to $(Cr_{1.22}Al_{0.74}Ti_{0.01}Fe_{0.01}V_{0.01})_{\Sigma=1.99}Be_{1.03}O_4$.

Occurrence: Replacing low-Al chromite of chromitite lens in serpentinite, probably of metasomatic origin.

Association: Fluorophlogopite, eskolaite, dravite-fluordravite, chromite.

Distribution: Mariinskoye (Malyshevskoe) Be deposit, Ural Emerald Mines, Middle Urals, Russia.

Name: For the locality from which the first specimens were collected.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, and the Ural Geological Museum, Ekaterinburg, Russia.

References: (1) Pautov, L.A., M.P. Popov, Yu.V. Erokhin, V.V. Khiller, and V.Y. Karpenko (2012) Mariinskite, $BeCr_2O_4$, a new mineral, chromium analogue of chrysoberyl. Zap. Ross. Mineral. Obshch., 141(6), 43-62 (in Russian, with English abstract). (2) (2014) Amer. Mineral., 99, 246-247 (abs. ref. 1). (3) Yamnova, N.A., S.M. Aksenov, L.A. Pautov, M.P. Popov, and Yu.V. Erokhin (2014) Specific features of cation distribution in the crystal structure of mariinskite $BeCr_2O_4$ (Derivative of olivine-type structure). Crystallography Reports, 59(1), 30-35.