

Oxy-chromium-dravite, $\text{NaCr}_3(\text{Cr}_4\text{Mg}_2)(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{O}$, a new mineral species of the tourmaline supergroup

FERDINANDO BOSI,^{1,*} LEONID REZNITSKII,² AND HENRIK SKOGBY³

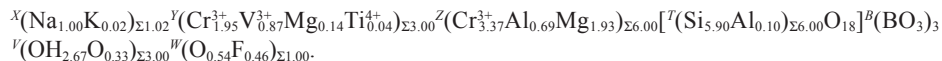
¹Dipartimento di Scienze della Terra, Sapienza Università di Roma, P.le A. Moro, 5, I-00185 Rome, Italy

²Russian Academy of Science, Siberian Branch, Institute of the Earth's Crust, Lermontova Street, 128, Irkutsk, Russia

³Department of Mineralogy, Swedish Museum of Natural History, Box 50007, SE-10405 Stockholm, Sweden

ABSTRACT

Oxy-chromium-dravite, $\text{NaCr}_3(\text{Cr}_4\text{Mg}_2)(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{O}$, is a new mineral of the tourmaline supergroup. It is found in metaquartzites of the Pereval marble quarry (Sludyanka, Lake Baikal, Russia) in association with quartz, calcite, chromphyllite, eskolaite, chromite, uvarovite, chromian phlogopite, and pyroxenes of the diopside-kosmochlor series, Cr-bearing tremolite, Cr-bearing titanite, Cr-bearing rutile, and pyrite. Crystals are emerald green, transparent with a vitreous luster, green streak, and conchoidal fracture. Oxy-chromium-dravite has a VHN hardness of 14 540 MPa, a Mohs hardness of approximately 7½, and a calculated density of 3.3 g/cm³. In plane-polarized light, oxy-chromium-dravite is pleochroic (O = dark green, E = yellow green) and uniaxial negative: $\omega = 1.765(5)$, $\epsilon = 1.715(5)$. Oxy-chromium-dravite is rhombohedral, space group $R\bar{3}m$, with the unit-cell parameters $a = 16.1121(3)$, $c = 7.3701(1)$ Å, $V = 1656.95(5)$ Å³, $Z = 3$. The chemical characterization resulted in: SiO₂ = 31.73, TiO₂ = 0.31, B₂O₃ = 9.35, Al₂O₃ = 3.61, Cr₂O₃ = 36.25, V₂O₃ = 5.81, MgO = 7.49, Na₂O = 2.78, K₂O = 0.08, F = 0.78, H₂O = 2.16, sum 100.01 wt%. The unit formula is



The crystal structure of oxy-chromium-dravite was refined to statistical index $R1$ for all reflections equal to 1.54% using $\text{MoK}\alpha$ X-ray intensity data. Oxy-chromium-dravite is related to chromium-dravite, ideally $\text{NaMg}_3\text{Cr}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{OH}$, by the heterovalent substitution $\text{Cr}^{3+} + \text{O}^{2-} \rightarrow \text{Mg}^{2+} + \text{OH}^{1-}$.

Keywords: Oxy-chromium-dravite, tourmaline, new mineral species, crystal-structure refinement, electron microprobe