

Oxy-vanadium-dravite, $\text{NaV}_3(\text{V}_4\text{Mg}_2)(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{O}$: Crystal structure and redefinition of the “vanadium-dravite” tourmaline

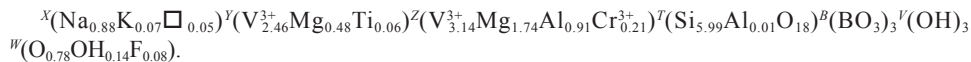
FERDINANDO BOSI,^{1,*} LEONID Z. REZNITSKII,² AND EUGENE V. SKLYAROV²

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

²The Siberian Division of Russian Academy of Sciences, Institute of the Earth's Crust, Irkutsk, 664033, Russia

ABSTRACT

“Vanadium-dravite” $\text{NaMg}_3\text{V}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{OH}$ (IMA number 1999-050) has been redefined as oxy-vanadium-dravite with end-member formula $\text{NaV}_3(\text{V}_4\text{Mg}_2)\text{Si}_6\text{O}_{18}(\text{BO}_3)_3(\text{OH})_3\text{O}$. The new name and the new formula have been approved by the CNMNC (IMA proposal 11-E). Oxy-vanadium-dravite occurs in the metamorphic rocks of the Sludyanka complex (southern Baikal region, Russia). The crystal structure of oxy-vanadium-dravite has been refined for the first time using single-crystal X-ray data, with a statistical index *R*1 for all reflections converging to 1.44%. The structure is rhombohedral, space group *R*3*m*, with the unit-cell parameters *a* = 16.1908(4), *c* = 7.4143(2) Å, *V* = 1683.21(7) Å³, *Z* = 3. The chemical characterization resulted in the empirical structural formula:



Ideally, the oxy-vanadium-dravite is related to oxy-dravite and oxy-chromium-dravite by the homovalent substitution $\text{V}^{3+} \rightarrow \text{Al}$ and $\text{V}^{3+} \rightarrow \text{Cr}^{3+}$ (respectively) at the *Y* and *Z* sites. The occurrence of solid-solutions among V^{3+} , Cr^{3+} , and Al have been observed in tourmalines from metamorphic rocks of the Sludyanka complex. Significant chemical variations in V^{3+} , Cr^{3+} , and Al were also observed within zoned crystals from Sludyanka, not belonging to the holotype specimen.

Keywords: Oxy-vanadium-dravite, tourmaline, crystal-structure refinement, electron microprobe, new end-member