American Mineralogist, Volume 96, pages 895–913, 2011

Nomenclature of the tourmaline-supergroup minerals

Darrell J. Henry,[1,*] Milan Novák (chairman),[2] Frank C. Hawthorne,[3] Andreas Ertl,[4] Barbara L. Dutrow,[1] Pavel Uher,[5] and Federico Pezzotta[6]

[1]Department of Geology and Geophysics, Louisiana Street University, Baton Rouge, Louisiana 70803, U.S.A.
[2]Chairman of the Subcommittee on Tourmaline Nomenclature, Department of Geological Sciences, Petrology and Geochemistry, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic
[3]Department of Geological Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada
[4]Institut für Mineralogie und Kristallographie Geozentrum, Universität Wien, Althanstrasse 14, 1090 Wien, Austria
[5]Department of Mineral Deposits, Faculty of Natural Sciences, Department of Mineralogy and Petrology, Comenius University in Bratislava, Mlynská dolina, 842 15 Bratislava, Slovak Republic
[6]Mineralogy Department, Museo di Storia Naturale di Milano, Corso Venezia 55, I-20121 Milan, Italy

Abstract

A nomenclature for tourmaline-supergroup minerals is based on chemical systematics using the generalized tourmaline structural formula: $XY_3Z_6(T_6O_{18})(BO_3)_3V_3W$, where the most common ions (or vacancy) at each site are X = Na^{1+}, Ca^{2+}, K^{1+}, and vacancy; Y = Fe^{2+}, Mg^{2+}, Mn^{2+}, Al^{3+}, Li^{1+}, Fe^{3+}, and Cr^{3+}; Z = Al^{3+}, Fe^{3+}, Mg^{2+}, and Cr^{3+}; T = Si^{4+}, Al^{3+}, and B^{3+}; B = B^{3+}; V = OH^{1-} and O^{2-}; and W = OH^{1-}, F^{1-}, and O^{2-}. Most compositional variability occurs at the X, Y, Z, W, and V sites. Tourmaline species are defined in accordance with the dominant-valency rule such that in a relevant site the dominant ion of the dominant valence state is used for the basis of nomenclature. Tourmaline can be divided into several groups and subgroups. The primary groups are based on occupancy of the X site, which yields alkali, calcic, or X-vacant groups. Because each of these groups involves cations (or vacancy) with a different charge, coupled substitutions are required to relate the compositions of the groups. Within each group, there are several subgroups related by heterovalent coupled substitutions. If there is more than one tourmaline species within a subgroup, they are related by homovalent substitutions. Additionally, the following considerations are made. (1) In tourmaline-supergroup minerals dominated by either OH^{1-} or F^{1-} at the W site, the OH^{1-}-dominant species is considered the reference root composition for that root name: e.g., dravite. (2) For a tourmaline composition that has most of the chemical characteristics of a root composition, but is dominated by other cations or anions at one or more sites, the mineral species is designated by the root name plus prefix modifiers, e.g., fluor-dravite. (3) If there are multiple prefixes, they should be arranged in the order occurring in the structural formula, e.g., "potassium-fluor-dravite."

Keywords: Tourmaline, mineral chemistry, nomenclature, substitutions, order-disorder