

Application and implications of the new nomenclature of the amphibole supergroup

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Producing a rational and straightforward scheme for the classification of complex mineral groups often implies a long and winding road. In the case of the amphibole supergroup, $A_{0-1}B_2C_5T_8O_{22}W_2$, efforts started in 1968, and proceeded under the guidance of Bernard Leake until 2006. In the last 20 years, however, discovery of new amphibole compositions (especially, ^CLi and $^W\text{O}^{2-}$ amphiboles) clearly showed that a system based on stoichiometric ranges of A-, B- and T-group cations failed to represent such complexity. A major attention to crystal-chemistry, the use of the concepts of dominant valency, and classification based on A-, B- and C-group cations were discussed but not implemented during the almost 10-years discussion which produced the Leake et al. (1997) report. Unfortunately, the logic of minor changes and limited redefinitions eventually prevailed. However, these concepts germinated in the mineralogical literature and were implemented for smaller mineral groups (e.g., hellandite: Oberti et al. 2002; arrojadite: Chopin et al. 2006; epidote: Armbruster et al. 2006) until the dominance criterion was adopted by IMA-CNMCN (Hatert & Burke 2008). The newly approved scheme for the nomenclature and classification of the amphibole supergroup adheres to the concepts of dominant group valency and dominant ion. The hierarchy of classification proceeds through the W (\rightarrow groups), B (\rightarrow subgroups), and C and A (\rightarrow rootnames) ions in a rational and comprehensive scheme which takes into account amphibole stability based on synthesis work. The use of prefixes now refers to $^A\text{Na}^C(\text{Mg,Al})$ root compositions (starting points), with a few exceptions that recognize the petrological relevance of some $^C(\text{Fe}^{2+}, \text{Fe}^{3+})$ rootnames. The new scheme implies redefinition of a number of rootnames and species, but the overall pattern is greatly simplified and can be easily handled by a series of inequalities. Hence, the present pain of expert mineralogists and petrologists will be hopefully compensated by the future relief for younger scientists. More important, the scheme will no longer allow oddities such as the use of different rootnames for compositions differing solely by homovalent cations (e.g., pargasite and ehimeite). In parallel with the preparation of the report on amphiboles, new nomenclature schemes for other mineral groups have been developed by other subcommittees (tourmaline: Henry et al. 2011; garnet: Grew et al. 2012), which are based on the dominant valency rule and the dominant ion criterion. This will hopefully bring consistency to these classification schemes. Major requirements for using these classification schemes effectively have been and should be a complete (multi-technique) chemical analysis and a correct crystal-chemical model for ion assignment. This is undoubtedly the route to be followed in the future for all mineral groups.

Armbruster et al. (2006) *E.J.M.*, 18, 551-567; Chopin et al. (2006) *Am. Min.*, 91, 1260-1270; Grew et al. (2012) *Am. Min.* in press; Hatert & Burke (2008) *Can. Min.*, 40, 679-710; Henry et al. (2011) *Am. Min.*, 96, 895-913; Leake et al. (1997) *Can. Min.*, 35, 219-246; Oberti et al. (2002) *Am. Min.*, 87, 745-752.