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# WILUITE, $Ca_{19}(Al,Mg,Fe,Ti)_{13}(B,Al,\square)_5Si_{18}O_{68}(O,OH)_{10}$, A NEW MINERAL SPECIES ISOSTRUCTURAL WITH VESUVIANITE, FROM THE SAKHA REPUBLIC, RUSSIAN FEDERATION: REPLY

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## COMMENT

Galuskin & Galuskina (2000) seem unaware of the requirements for defining and naming a new mineral species. These requirements are set out in detail by the Commission on New Minerals and Mineral Names of the International Mineralogical Association, and were adhered to exactly by Groat *et al.* (1998) in their description of the new mineral species *wiluite*. In a paper intended only to report the accreditation and name of a new mineral species, an extensive treatment of all aspects of that mineral is inappropriate, particularly when the mineral is one with a long history and a considerable volume of previous published work. Following the same logic, we find the comments of Galuskin & Galuskina (2000) irrelevant and inappropriate. Indeed, use of the phrase "a boron-bearing variety of vesuvianite" prompts the question as to whether the paper of Groat *et al*. (1998) was even understood by Galuskin & Galuskina (2000). Groat *et al*. (1998) showed that wiluite is NOT just a variety of vesuvianite but a distinct species that deserves the status of a mineral isostructural with vesuvianite.

Although there has been much work on wiluite from the Wilui River area, Sakha Republic, Russian Federation over the past 200 years, it was not until the crystallographic work of Groat *et al.* (1994) that the details of the mechanism of incorporation of B into the vesuvianite structure were elucidated. They showed that B occupies two new sites in the vesuvianite structure. Where these sites are more than half-occupied, a new name is warranted, and the formal description of this new species was the topic treated by Groat *et al.* (1998).

## DISCUSSION

In view of the comments of Galuskin & Galuskina (2000), we feel compelled to respond to some of their arguments. Of course, Groat *et al.* (1998) did not refer to many previous studies. They were only describing the *holotype sample* as required by the formal process for the definition of a new mineral species. Of course, other samples show different features; it is extremely unlikely that they would not, particularly with regard to the sector zoning observed in wiluite. In a paper that seems to have escaped the attention of Galuskin & Galuskina (2000), Groat *et al*. (1993) examined this aspect of the vesuvianite structure, and showed that vesuvianite is a ferroelastic that undergoes a continuous second-order phase transition on cooling. Differences between the crystallization temperature and the initial temperature of the transition cause different sector-zoning textures to develop in different crystals.

Galuskin & Galuskina (2000) can be as surprised as they like about the homogeneity of the crystal described by Groat *et al*. (1998), the data are quite clear on this point. The fact that other B-bearing vesuvianite and wiluite crystals are not homogeneous is hardly unusual; such differences are the norm rather than the exception in complex rock-forming minerals. Moreover, one does not expect the sector zoning to change radically with minor changes in chemical composition; what Galuskin & Galuskina (2000) report on this issue is to be expected.

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Groat *et al*. (1992) did not "disregard" the results of Wherry & Chapin (1908) on the determination of B in Yakutian vesuvianite; they "viewed the result with caution", as it departed from many of the other analytical data for B in vesuvianite from this locality (*e.g.*, Jannasch 1884, Rammelsberg 1886). There seems to be no reason why both *T* sites in wiluite should not be filled with B; this indicates an upper limit of ~5.6 wt% $B_2O_3$ in wiluite, which encompasses the results quoted by Galuskin & Galuskina (2000).

Of course, further work on wiluite is warranted. However, the point of the work of Groat *et al*. (1998) is that the work will now be done on the eponymous wiluite and not just on boron-bearing vesuvianite.

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