American Mineralogist, Volume 101, pages 1700–1703, 2016

Letter

Discreditation of diomignite and its petrologic implications

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Abstract

Diomignite ($Li_2B_4O_7$) is discredited as a mineral species, and this discreditation has been approved by the International Mineralogical Association, Commission on New Minerals, Nomenclature and Classification. Diomignite was originally reported to occur in virtually every crystal-rich inclusion in spodumene from the Tanco pegmatite in southeastern Manitoba, Canada. However, detailed study of 30 randomly selected crystal-rich inclusions in the purported type material deposited at the U.S. National Museum of Natural History, 30 inclusions in the purported type material from the American Museum of Natural History, and several hundred inclusions in self-collected samples reveals that diomignite is absent in every inclusion examined. Because no holotype specimen exists and no neotype sample was provided by the surviving authors of the original description, the presence of diomignite could not be validated. The evidence provided in the original description to the IMA in 1984 is shown to be insufficient to support the existence of diomignite as a mineral species.

The previously reported boron-rich (12 mass% B_2O_3) composition of the melt represented as crystal-rich inclusions in spodumene and petalite from the Tanco pegmatite was predicated on the assumption that diomignite is a common daughter mineral that occurs in most inclusions and that the inclusions are primary melt inclusions. The nonexistence of diomignite, and the absence of other borate daughter minerals, in these crystal-rich inclusions indicates that the boron content was greatly overestimated and so comparisons to experimentally generated boron-rich (>10 mass% B_2O_3) boundary-layer melts are unwarranted. Furthermore, the discreditation of diomignite negates the inferred role of a $Li_2B_4O_7$-flux-rich melt in the generation of primary pegmatite textures and rare element oxide mineralization in the Tanco pegmatite.

Keywords: Diomignite, discreditation, pegmatite, inclusions, boron, internal evolution