

LETTER

Kumdykolite from the ultrahigh-pressure granulite of the Bohemian Massif

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ABSTRACT

We report the first occurrence of kumdykolite, a high-temperature analog of albite, in the European Variscan belt. It was discovered in an ultrahigh-pressure, diamond-bearing quartzofeldspathic granulite from the northern Bohemian Massif. It is associated with phlogopite and quartz in a multiphase solid inclusion within garnet, considered to represent a trapped fluid or melt phase. Micro-Raman analysis and mapping along with BSE revealed the presence of a sub-equant, elongated grain of kumdykolite reaching 20 μm in length. WDX analysis has shown that kumdykolite contains 2 wt% CaO, probably indicating significant miscibility with the Ca-end-member svyatoslavite. Similar to the case of microdiamond inclusions, the kumdykolite-bearing multiphase inclusion is located in the Ca- and Mg-rich central part of the garnet and thus must have been trapped at $P > 4$ GPa. The inclusion minerals, however, crystallized upon decompression and cooling during the exhumation. Kumdykolite preservation thus provides independent evidence for high temperature of the original trapped fluid, or melt, crystallization, and rapid cooling of the rocks. Our results imply that kumdykolite and other feldspar modifications stable at elevated pressures and temperatures may be common phases in quartzofeldspathic granulites and need to be searched for.

Keywords: High-temperature studies, kumdykolite, micro-Raman, micro-Raman mapping, BSE, WDX, high-temperature, ultrahigh-pressure, granulite, microdiamond