

Abstract Submission

P4_27

T3 - Minerals, systematics, gems, collections

On the labyrinthine world of open-framework minerals: occurrence, crystal-chemistry, properties and utilization

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High-pressure behaviour and phase transition of jadarite

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Abstract Content: In the last decades, the rise of worldwide lithium request has been driven by the increasing demand for new power storage systems and electric devices. Jadarite, ideally $\text{LiNaSiB}_3\text{O}_7(\text{OH})$, Sp. Gr. $P2_1/c$, is a relatively new open-framework mineral species discovered in the Jadar Basin, Serbia. Being Li- and B-bearing minerals classified as critical raw materials by the EU Commission, from a marketable point of view, jadarite is a unique mineral due to its high content of Li_2O (ca. 7.3 wt%) and B_2O_3 (ca. 47.2 wt%) and, given that a massive 1Mt deposit in the Jadar basin has been recently estimated, it is likely that this mineral will be exploited in the near future. To date, no experiment has ever been performed on this open-framework mineral at non-ambient conditions. In this study we report a re-investigation of the crystal structure of jadarite on the basis of single-crystal synchrotron X-ray diffraction data and we provide an analysis of its compressional behaviour under hydrostatic conditions up to 20 GPa. Between 16.57(5) and 17.04(5) GPa, jadarite undergoes a first-order iso-symmetric phase transition, reconstructive in character (ΔV -3%), mainly involving a re-arrangement of the Li- and Na-coordination environments. The elastic behaviour of jadarite has been described leading to a refined bulk modulus of 55.0(5) GPa ($K_V' = 3.84(9)$).

Disclosure of Interest: None Declared