

## **Crystal chemistry of high-pressure BaSi<sub>4</sub>O<sub>9</sub> in the trigonal (*P*3) barium tetragermanate structure**

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### **ABSTRACT**

Crystals of BaSi<sub>4</sub>O<sub>9</sub> synthesized at 4 GPa and 1000 °C were determined to be isostructural with barium tetragermanate [trigonal, space group *P*3,  $a = 11.2469(11)$  and  $c = 4.4851(6)$  Å,  $V = 491.3(1)$  Å<sup>3</sup>]. The structure ( $R = 2.4\%$ ) features a corner-linked framework of three-member silicate tetrahedral rings, which are cross-linked by isolated silicate octahedra. Ba cations occupy tenfold-coordinated sites in channels defined by the silicate framework. This structure is 4.2% denser than the topologically similar benitoite form of high-pressure BaSi<sub>4</sub>O<sub>9</sub>, which was produced by grinding the barium tetragermanate-type crystals described in this report.