High-Pressure Synthesis and Crystal Structure of the New Orthorhombic Polymorph β-HgB_4O_7

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Z. Naturforsch. **60b,** 815 – 820 (2005); received April 27, 2005

The new orthorhombic polymorph β-HgB_4O_7 has been synthesized under high-pressure and high-temperature conditions in a Walker-type multianvil apparatus at 7.5 GPa and 600 °C. β-HgB_4O_7 is isotypic to the known ambient pressure phases MB_4O_7 (M = Sr, Pb, Eu) and the high-pressure phase β-CaB_4O_7 crystallizing with two formula units in the space group $Pmn2_1$ with lattice parameters $a = 1065.6(2)$, $b = 438.10(9)$, and $c = 418.72(8)$ pm. The relation of the crystal structure of the high-pressure phase β-HgB_4O_7 to the normal pressure phase α-HgB_4O_7 as well as the relation to the isotypic phases MB_4O_7 (M = Sr, Pb, Eu) and β-CaB_4O_7 are discussed.

Key words: High-Pressure, Mercury, Borates, Crystal Structure