The High-Pressure Modification of CePtSn – Synthesis, Structure, and Magnetic Properties

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The high-pressure (HP) modification of CePtSn was prepared under multianvil high-pressure (9.2 GPa) high-temperature (1325 K) conditions from the normal-pressure (NP) modification. Both modifications were investigated by powder and single crystal X-ray data: TiNiSi type, *Pnma*, a = 746.89(9), b = 462.88(4), c = 801.93(7) pm, wR2 = 0.0487, $452 F^2$ values, 20 variable parameters for NP-CePtSn, and ZrNiAl type, $P\overline{62m}$, a = 756.919(5), c = 415.166(4) pm, wR2 = 0.0546, $252 F^2$ values, 14 variable parameters for HP-CePtSn. Both modifications are built up from platinum-centered trigonal prisms. Together, the platinum and tin atoms form different three-dimensional [PtSn] networks in which the cerium atoms fill channels. The crystal chemistry and chemical bonding of NP- and HP-CePtSn is discussed. Susceptibility measurements of HP-CePtSn indicate Curie-Weiss behavior above 40 K with an experimental magnetic moment of $2.55(1) \mu_{\rm B}$ /Ce atom, indicating trivalent cerium. No magnetic ordering could be detected down to 2 K.

Key words: High-Pressure, Intermetallics, Magnetism, Crystal Structure