

## Two polymorphs of Ce<sub>2</sub>Rh<sub>2</sub>Ga

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Most of R<sub>2</sub>T<sub>2</sub>X phases crystallize in the four structure types: Mo<sub>2</sub>B<sub>2</sub>Fe (tetragonal, *P4/mbm*), Er<sub>2</sub>Au<sub>2</sub>Sn or U<sub>2</sub>Pt<sub>2</sub>Sn (tetragonal, *P4<sub>2</sub>/mnm*) - a superstructure of Mo<sub>2</sub>B<sub>2</sub>Fe, W<sub>2</sub>B<sub>2</sub>Co (orthorhombic, *Immm*), and Mn<sub>2</sub>B<sub>2</sub>Al (orthorhombic, *Cmmm*) [1]. Five less common types are encountered in literature. Two of these are monoclinic ones: HT-Pr<sub>2</sub>Co<sub>2</sub>Al or Ca<sub>2</sub>Ir<sub>2</sub>Si (*C2/c*) - stacking variant of the W<sub>2</sub>B<sub>2</sub>Co [2,3] - and LT-Nd<sub>2</sub>Cu<sub>2</sub>Cd (*C2/c*, own structure type) - superstructure of Mn<sub>2</sub>B<sub>2</sub>Al [4]; the other three structures are orthorhombic: La<sub>2</sub>Ni<sub>3</sub> (*Cmce*) [5], *o*-La<sub>2</sub>Ni<sub>2</sub>In (*Pbam*) [6], and Ca<sub>2</sub>Pd<sub>2</sub>Ge (*Fdd2*) [7]. Only a few representatives of these types are reported to date.

The structural diversity of the R<sub>2</sub>T<sub>2</sub>X family is frequently accompanied by polymorphic phenomena between these structure types. We report on the synthesis and crystal structure of the new ternary intermetallic Ce<sub>2</sub>Rh<sub>2</sub>Ga. Its formation and dimorphism have been investigated by powder and single crystal X-ray diffractometry, as well as by differential thermal analyses. LT- and HT-Ce<sub>2</sub>Rh<sub>2</sub>Ga can be obtained by the chosen respective thermal treatment. The HT-Ce<sub>2</sub>Rh<sub>2</sub>Ga, stable above 864(5)°C, is orthorhombic La<sub>2</sub>Ni<sub>3</sub>-type [*Cmce*, *o*S20, *a*=5.851(2) Å, *b*=9.618 (2) Å, *c*=7.487 (2) Å, *V*=421.3(2) Å<sup>3</sup>]; the LT-Ce<sub>2</sub>Rh<sub>2</sub>Ga, stable below this temperature, is monoclinic Pr<sub>2</sub>Co<sub>2</sub>Al - (Ca<sub>2</sub>Ir<sub>2</sub>Si-) type [*C2/c*, *m*S20, *a*=10.0903(6) Å, *b*=5.6041(3) Å, *c*=7.8153(4) Å, *β*=104.995(3)°, *V*=426.88(4) Å<sup>3</sup>].

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