

Abstract Submitted  
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**Pressure effect on the isostructural transition in RNiAl compounds (R=Tb and Gd)** JIRI PRCHAL, MILAN KLICPERA, PETR DOLEZAL, JIRI KASTIL, MARTIN MISEK, PAVEL JAVORSKY, Charles University in Prague, DCMP — TbNiAl and GdNiAl belong to a large group of compounds crystallizing in the hexagonal ZrNiAl-type of structure. Within recent years, physics of the discontinuity in the temperature or composition dependence of the lattice parameters ( $a$  and  $c$ ) observed in several compounds of this family of intermetallics has been of particular interest. These materials have in common a specific “forbidden” value of the  $c/a$  ratio. This conclusion has been corroborated by ab initio calculations [1]. Although the dramatic structure change is hardly observable in the temperature dependence of the specific heat, it is accompanied with a clear change of the effective magnetic moment, change of the crystal field energy spectra [2] and namely with increasing amount of mechanical defects in the sample. TbNiAl as a representative of such behavior, exhibits a first-order structural transition at low temperatures around 100K [3]. We have for the first time studied this structural step upon application of hydrostatic pressure on both – poly- and monocrystal of TbNiAl and a polycrystalline GdNiAl, in which the structural step appears still higher - around 240K. Our experimental observation of an unusually rapid decrease of the critical temperature with pressure will be discussed in terms of differences in the strength of the inter- and intraplanar chemical bonding in this type of structure. [1] J. Prchal et al., Phys. Rev. B 77 (2008) 134106. [2] P. Javorsky et al., J Magn. Magn. Mat. 317 (2007) e400. [3] J. Prchal et al., Physica B 378-380 (2006) 1102.

Jiri Prchal  
Charles University in Prague, DCMP

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