

Title: Magnetic properties of  $R_2TIn_8$  and related tetragonal compounds

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Abstract:

Intermetallic compounds  $R_2TIn_8$  ( $R$  = rare earth,  $T$  = transition metal), commonly called “218” because of stoichiometry, are structurally related to a class of well-known Ce-based heavy-fermions like CeCoIn<sub>5</sub> or CeRhIn<sub>5</sub>. They are located between fully 3D cubic compound (e.g. CeIn<sub>3</sub>) and quasi-2D “115” superconductors, which makes them ideal candidates to study structural dimensionality effects on various properties. Recent developments in this field showed that it is possible to grow compounds with  $T = Pd$  or  $Pt$  with “218” stoichiometry. Therefore further study of “218” compounds is desired since much less is known about them compared to “115” compounds.

We have focused mainly on the determination of magnetic structures and crystal field effects along the series of Rh based “218” compounds for various rare-earth elements. The single crystals of compounds with  $R = Nd, Tb, Dy, Ho, Er, Tm, La, Lu, Y$  were successfully grown. Results of bulk measurements (specific heat, susceptibility) together with magnetic structures determined from several neutron experiments are presented.

Keywords: crystal growth, phase diagrams, magnetic structure, neutron diffraction, group theory