

# Specific heat analysis of $Tb_2RhIn_8$ , $Dy_2RhIn_8$ , $Ho_2RhIn_8$

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Compound  $Ce_2RhIn_8$  shows a very interesting attributes at very low temperatures: it is interferromagnet with pressure-induced superconductivity ( $T_N=2,8K$ ,  $T_C=2K$  at  $p=2,5$  GPa).

Magnetism is a very good guide to the unconventional superconductivity. Study of magnetism in compounds with cer is very difficult due to side effects. Possible solution is to study isostructured compounds with another rare earth (Dy, Ho, Tb).

## Sample preparation

- claculation of weight of compounds
- placing into cups of  $Al_2O_3$  (Fig. 1.)
- placing into silica glass tube and evacuation of air
- heating up to  $910^\circ C$  and then slowly cooled down to  $410^\circ C$  (Fig. 2.)
- centrifuging of remaining indium flux
- crystals are complete

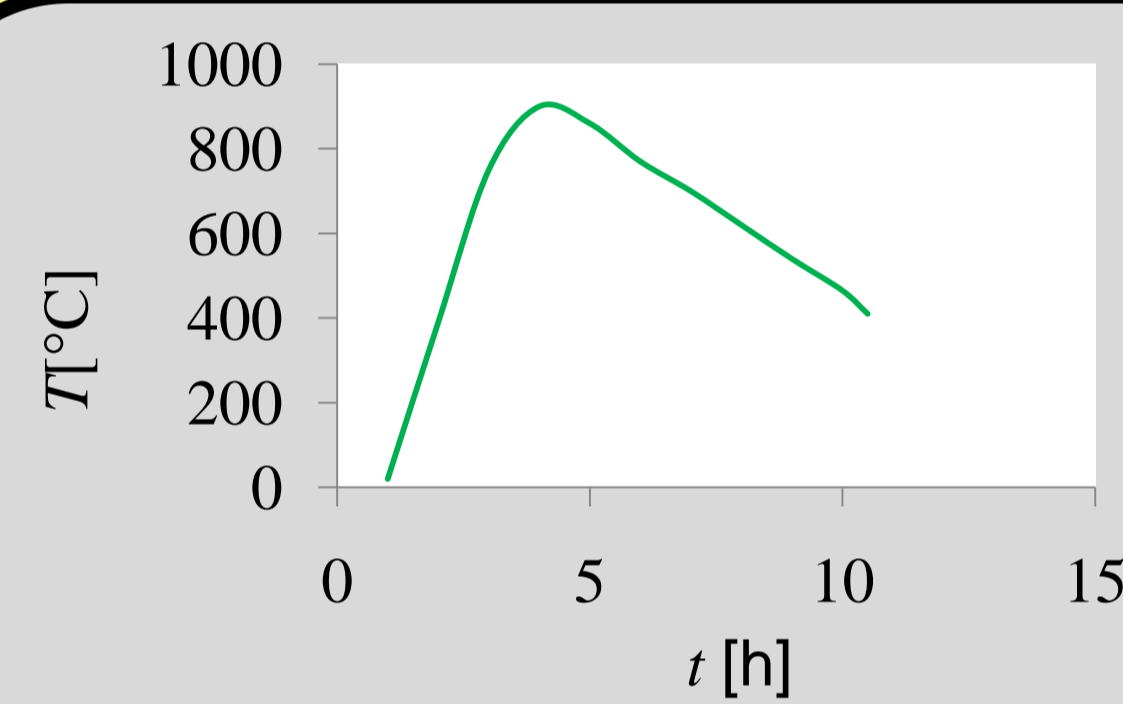


Fig. 2: temperatures during the growth process



Fig. 1.: Cups from  $Al_2O_3$

## Sample selection

- verifying of quality of crystals
- X-ray powder diffraction (XRPD)
- scanning electron microscope (SEM) equipped with energy-dispersive X-ray detector (EDX) Bruker (AXS)
- manual selection of the most ideal crystals for measurement

## Results

- we have calculated interestig phase diagrams
- the studied compounds behave antiferromagnetically (Fig. 4. AF1) with Néel temperatures
- in external magnetic field the compound transit into another antiferromagnetic phase (Fig. 4. AF2).

## Sample measurements

- specific heat measurement
- PPMS system
- obtained data used for calculation (magnetic phase diagrams, Fig.4.)

## Conclusions

- we have succesfully prepared and measured  $R_2RhIn_8$  compounds, the Dy and Ho compounds as the first ones
- all the compounds behave antiferromagnetically under Néel temperatures
- we found another antiferromagnetic phase (Fig 4. AF2)

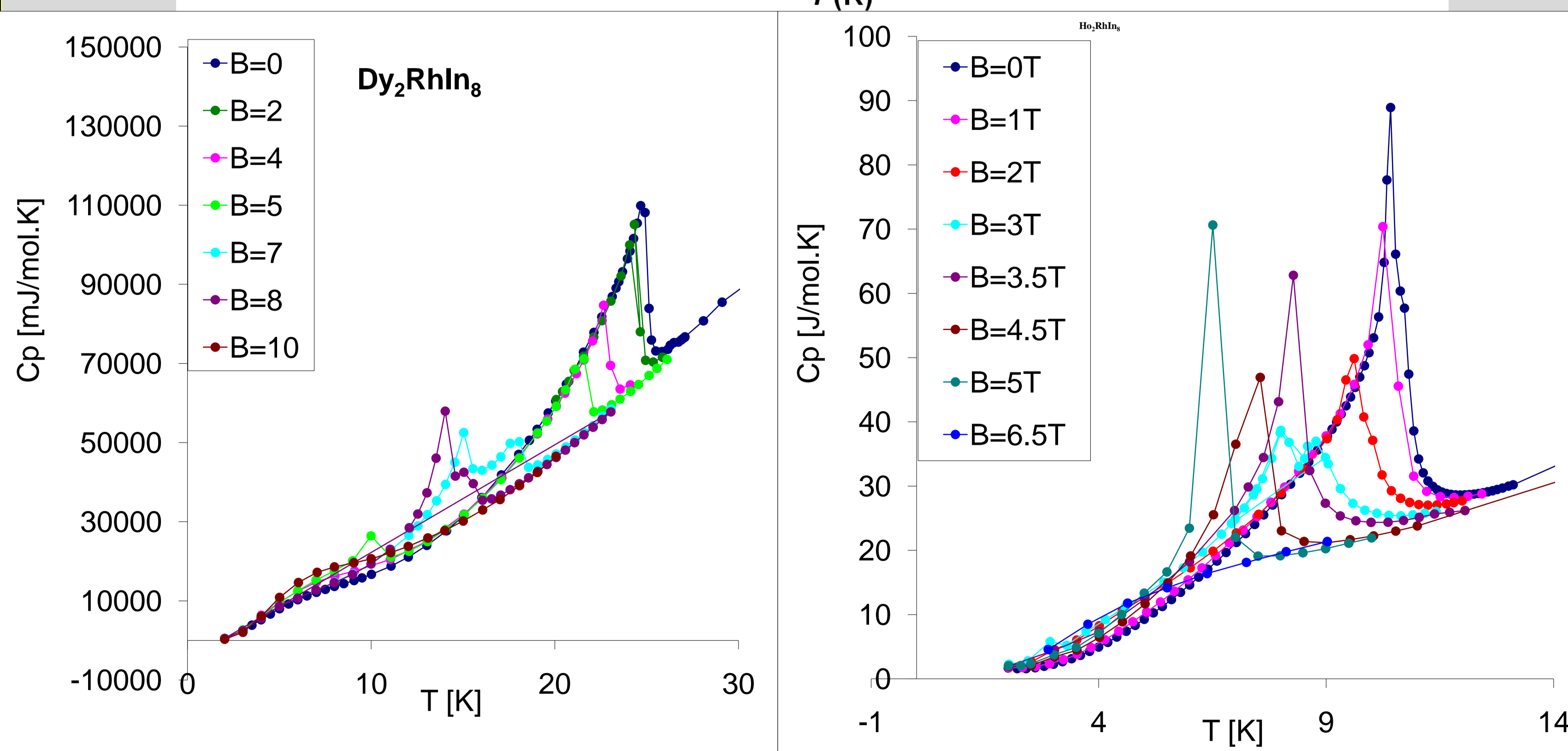
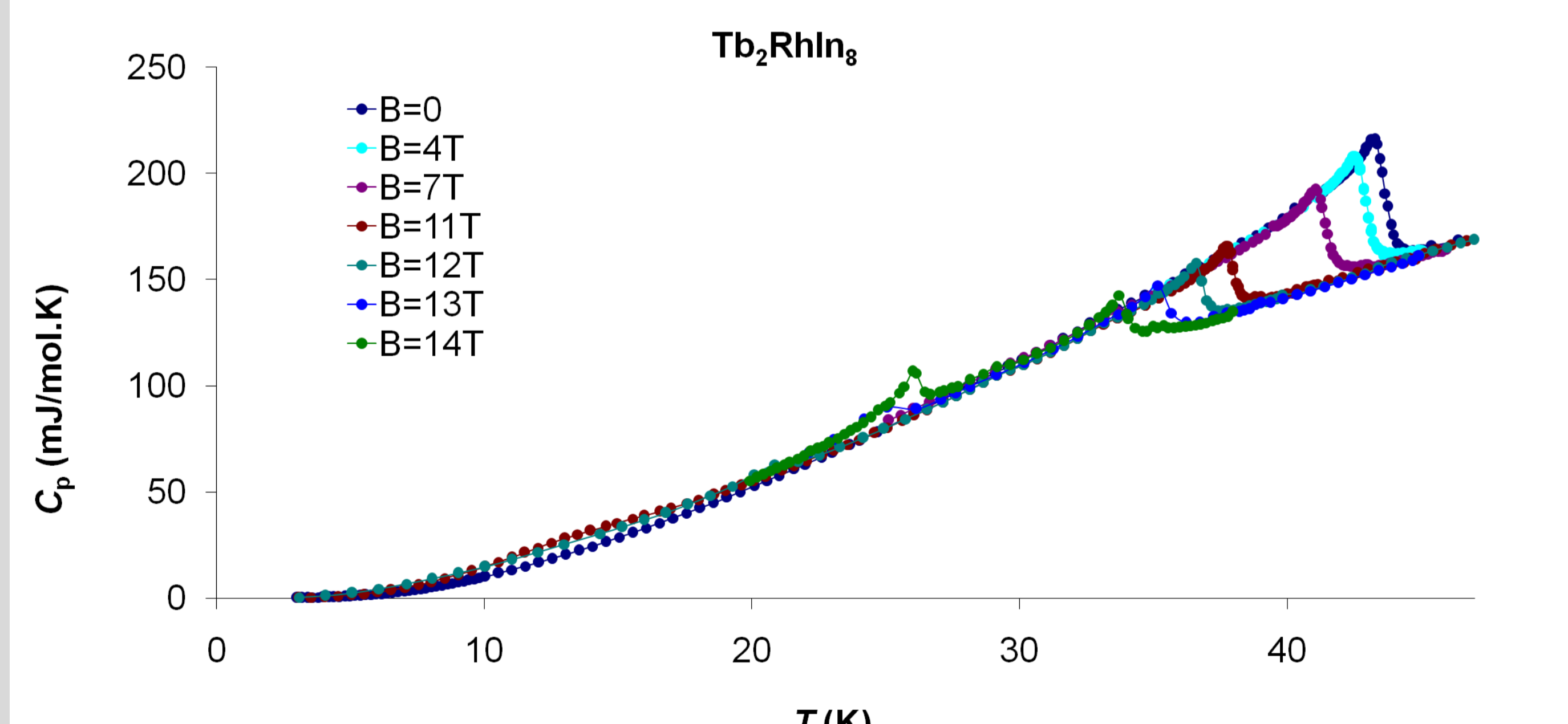


Fig. 3.: Specific heat of  $R_2RhIn_8$  compounds in the low temperature range.

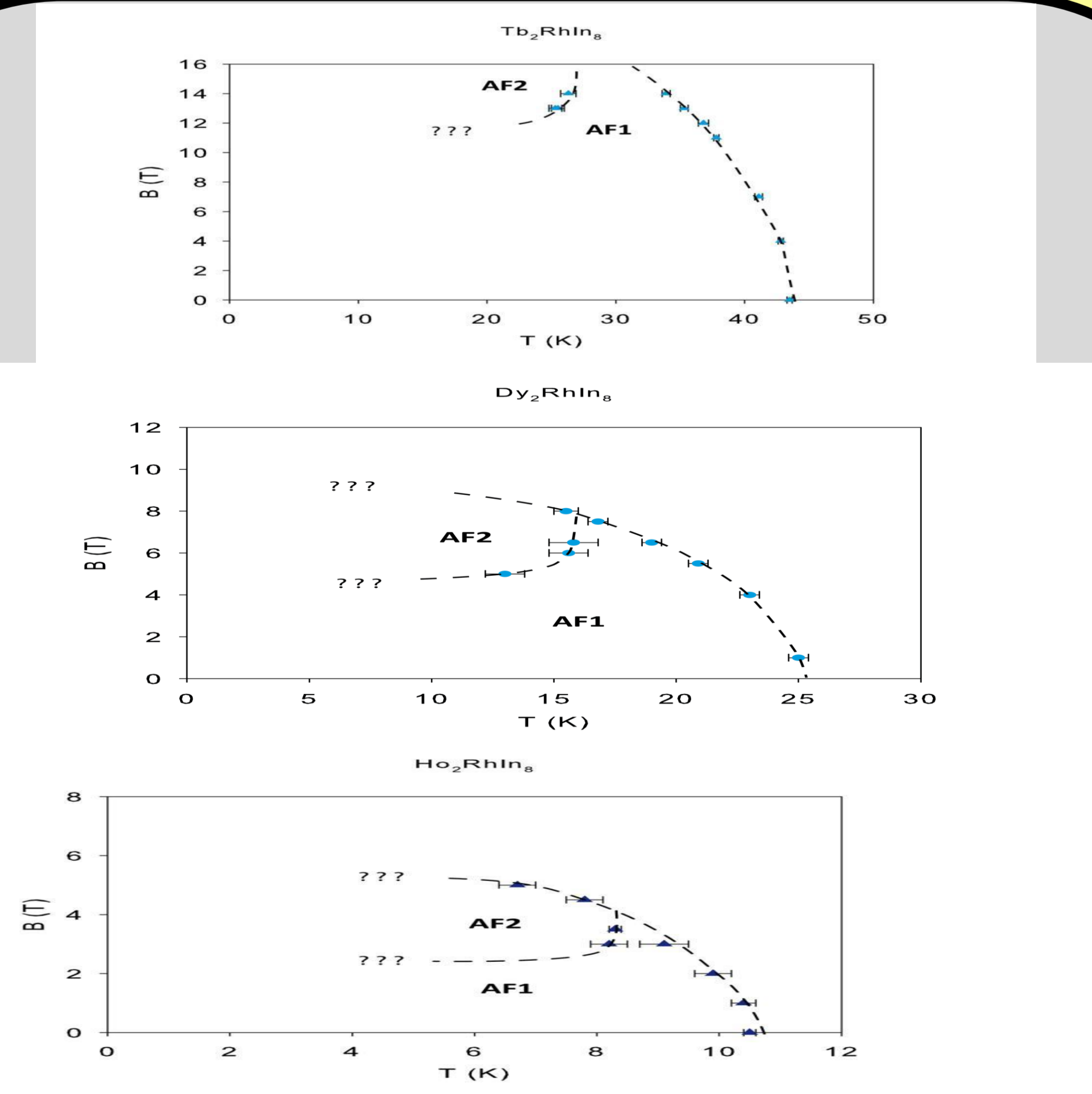


Fig. 4.: Magnetic phase diagrams of studied compounds ( $R_2RhIn_8$ ). Data were determined of specific heat measurements.