

HEAT CAPACITY STUDY OF Th P AND SOLID
SOLUTION UP_{0.5} As_{0.5}

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ABSTRACT

A magnetic phase diagram of the system $UAs_{1-x}P_x$ was examined by susceptibility (1) and neutron diffraction (2) measurements on powder samples. It was found that the temperature of the AFIA-AFI transition decreased monotonically from 64K for pure UAs to 23 K for $UAs_{0.25}P_{0.75}$.

Heat capacity measurements were made by using a dynamic differential calorimeter in the temperature range 5-300 K on the solid solution sample with $x \sim 0.5$ and on Th P.

An X-ray pattern of the solid solution showed also weak extra lines for UO_2 impurities and only one phase for Th P. The lattice constants of the investigated samples were 5.675 Å and 5.834 Å, respectively. The former value corresponds to the composition $x = 0.48$.

The specific heat curve for $UAs_{0.52}P_{0.48}$ showed a number of anomalies, where the two basic ones were at 39.6 and 121 K, in accordance with the magnetic susceptibility measurements (1).

These temperatures correspond to the AFIA-AFI transition and Néel point, respectively.

The obtained results were analyzed by using our new heat capacity data for Th P and already published ones for UAs (3). We have applied the "corresponding states" approximation for obtaining the lattice heat capacity contribution for the solid solution sample, using the average heat capacity values of Th P and Th As. This allowed us to find the magnitudes of a high temperature heat capacity coefficient $\gamma(300)$ and a magnetic entropy S_M . The latter value was found to be close to $R \ln 2$.

We have also reanalyzed the heat capacity results of UP, previously measured by Counsell et al. (4) and Yukokawa et al. (5) using our results

for Th P.

ABSTRACT

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