

Nonmagnetic-Magnetic Transition in a Ferromagnetic Dense Kondo System CeSi_x

H. Yashima, H. Mori, N. Sato and T. Satoh

Department of Physics, Faculty of Science, Tohoku University, Sendai, Japan

According to our previous investigation [1], the system of $\alpha\text{-ThSi}_2$ type inter-metallic compound CeSi_x ($1.55 \leq x \leq 2.00$) shows a nonmagnetic-magnetic transition at $x \approx 1.83$. In the composition range $1.85 \leq x \leq 2.00$, the system is non-magnetic at low temperatures. For the composition $x \leq 1.80$, the system undergoes a sharp magnetic transition at around 10 K. A ferromagnetic ordered state is indicated by the divergence of the susceptibility at T_c . Specific heat and magnetization measurements suggest a Kondo effect. This is the first example of a ferromagnetic dense Kondo system [2]. The nonmagnetic-magnetic transition occurs due to a competition between the Kondo effect and the RKKY interaction.

In order to see how the magnetic ordered state appears near the critical concentration, we have been making a detailed study of the system in the composition range $1.80 \leq x \leq 1.85$. The results of specific heat measurements are given in the figure. We can see that when the RKKY interaction overcomes the Kondo effect, the magnetic transition temperature suddenly appears at around 6 K.

A detailed discussion including the results of magnetization measurements and also the La-dilution effects will be published elsewhere.

References

- [1] H. Yashima and T. Satoh; Solid State Commun. 41 (1982) 723.
- [2] H. Yashima, H. Mori, K. Kohn and T. Satoh; Solid State Commun. 43 (1982) 193.

