

## Collapse-Like Decrease of RKKY Interaction and Kondo Effect in Heavy Fermion Compounds $(\text{Ce}_{1-x}\text{Gd}_x)\text{Ni}$ ( $0.03 \leq x \leq 0.20$ )

K. Yano<sup>a</sup>, K. Nishimura<sup>b</sup>, Y. Isikawa<sup>b</sup>, T. Ohta<sup>c</sup>, and K. Sato<sup>b</sup>

<sup>a</sup>College of Science and Technology, Nihon University, Chiba, Japan

<sup>b</sup>Graduate School of Science and Engineering, University of Toyama, Toyama, Japan

<sup>c</sup>Quantum Design Japan, Tokyo, Japan

CeNi is one of the most famous heavy fermion compounds and magnetically is inactive where both Ce and Ni are non-magnetic. On the other hand, the GdNi, which has the same structure as that of CeNi, is a ferri-magnet and not only Gd but also Ni are magnetic. That is, the Ni is non-magnetic in CeNi and magnetic in GdNi. It follows that in (Ce-Gd)Ni systems, Ni and even Ce are expected to change the electronic states according to the content of Gd. In this study, we analyze thoroughly the temperature dependence of magnetization  $M(T)$  at low content of Gd ( $x=0.03-0.20$ ) in  $(\text{Ce}_{1-x}\text{Gd}_x)\text{Ni}$ .

The magnetization behaviors in low contents of Gd are characterized as both the sensitivity to applied magnetic field ( $x=0.03-0.20$ ) and the linear relationship of the  $M(T)$  ( $x=0.10-0.20$ ). By employing the molecular field analysis of two-sublattice model, we have revealed that the exchange interactions between Gd and Gd,  $J_{\text{Gd-Gd}}$ , that is RKKY interaction, are extremely suppressed. This collapse-like decrease of RKKY interaction is the unique solution for reproducing the linear decrease of  $M(T)$  and the sensitivity to applied magnetic field. The details are to be discussed.