(P1-4)

Magnetic properties in single crystal $SmRu_4P_{12}$

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The filled skutterudite compound $SmRu_4P_{12}$ exhibits metal-insulator (MI) transition at $T_{MI} = 16.5$ K accompanied by magnetic anomaly, and shows another transition at $T_N = 14$ K [1,2]. Recently, octupole ordering is proposed as the most likely candidate for explaining this unusual properties of this compound [3]. However, the origin of the MI transition and the ground state of $SmRu_4P_{12}$ is not well understood. To clarify the ground state of this compound, it is powerful tool to investigate the magnetic anisotropy and to determine the magnetic phase diagram of this compound. We report the first experimental results on the anisotropy of magnetization M and specific heat C in $SmRu_4P_{12}$ single crystals for magnetic fields H along the three principal crystal directions [100], [110] and [111]. Figure 1 shows the temperature T dependence of the specific heat divided by temperature C/T under $H \sim 8$ T along with the fundamental axis in $SmRu_4P_{12}$. A large and sharp anomaly at T_{MI} is isotropic under the present condition. On the contrary, the broad maximum around T_N is anisotropic. These two features are also confirmed by M measurement. In the $M(T)$ under H up to 7 T, we observed clear anisotropic behavior around T_N, and this becomes large with increasing H under the investigated region. On the other hand, isotropic behaviors were observed around T_{MI}.

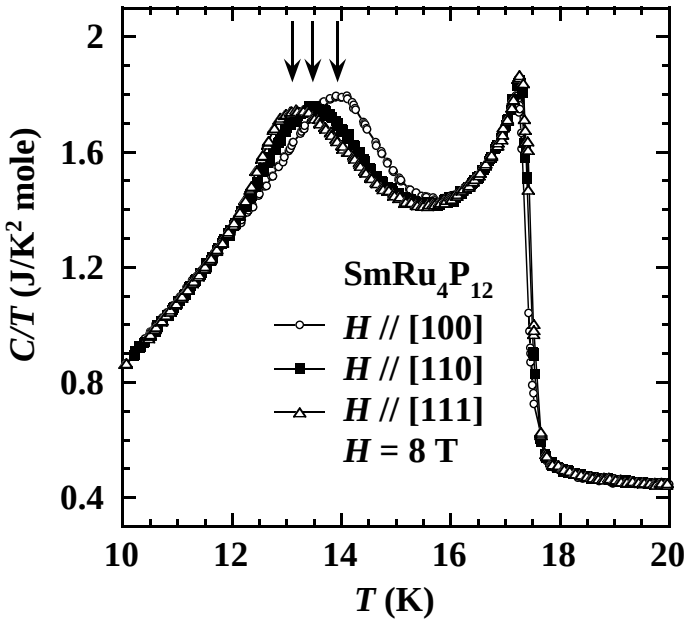

Figure 1: Temperature dependence of the specific heat divided by temperature C/T under the magnetic fields of $H = 8$ T along the three principal axes in $SmRu_4P_{12}$.

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[2] K. Matsuhira et al. J. Phys. Soc. Jpn. 71 (2002) Suppl. 237.
[3] M. Yoshizawa et al. J. Phys. Soc. Jpn. 74 (2005) 2141.