(P2-2)

Uniaxial pressure effect on the magnetic properties of the filled skutterudite compounds ROs_4Sb_{12}

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Unique properties related to the crystalline electric field (CEF) states involving quadrupolar degrees of freedom, e.g. the field-induced ordered state in $PrOs_4Sb_{12}$ [1], have recently attracted much attention. For such system where the quadrupolar interaction is expected to play an important role, uniaxial pressure experiment is a powerful tool to obtain useful information about the CEF levels, which can be controlled by the uniaxial pressure. In the present study, we focus on the newly-discovered heavy-fermion compound $SmOs_4Sb_{12}$. An interesting feature in $SmOs_4Sb_{12}$ is the heavy-fermion state insensitive to magnetic fields, which is suggested to correlate with the quadrupole moment of Sm ions [2]. It is also proposed that a four-level Kondo model based on the off-center rattling motion of ions in the cage can explain the exotic heavy-fermion state [3]. To clarify this issue, we investigate the uniaxial pressure effect on the magnetic properties of $SmOs_4Sb_{12}$. Figure 1 shows the preliminary result of the magnetization curve of $SmOs_4Sb_{12}$ under uniaxial pressure applied parallel to the magnetic field. By applying uniaxial pressure, the magnetization at high fields is suppressed, which may reflect the effect of symmetry breaking on the CEF ground state. At low fields, on the other hand, the hysteresis loop becomes larger with increasing pressure. This behavior shows a clear anisotropy for the magnetic field (not shown here), indicating that a weak ferromagnetism, which is another intriguing feature on $SmOs_4Sb_{12}$, is a bulk property.

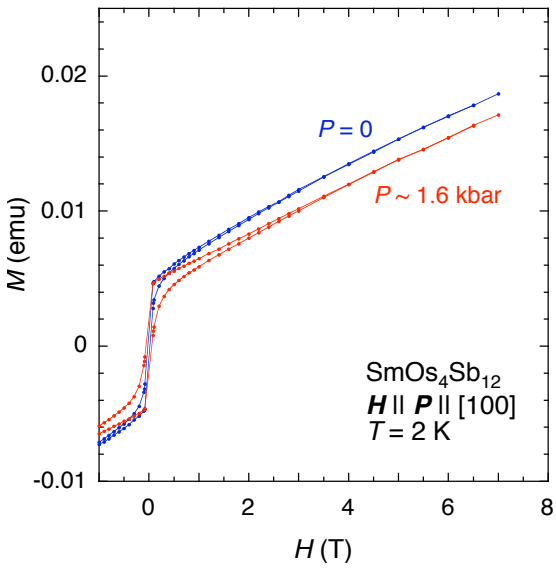

Figure 1: Magnetization curve of $SmOs_4Sb_{12}$ under uniaxial pressure.

[1] M. Kohgi *et al.*, J. Phys. Soc. Jpn. 72 (2003) 1002.
[2] S. Sanada *et al.*, J. Phys. Soc. Jpn. 74 (2005) 246.
[3] K. Hattori *et al.*, J. Phys. Soc. Jpn. 74 (2005) 3306.