(P-29)

Vortex lattice in $PrOs_4Sb_{12}$ studied by scanning tunneling spectroscopy

S. Kaneko[1], K. Takano[1], M. Furuyama[1], H. Sugawara[2], Y. Aoki[3], H. Sato[3] and N. Nishida[1]

[1]Department of Physics, Tokyo Institute of Technology, Tokyo, 152-8551
[2]Faculty of Integrated Arts and Sciences, Tokushima University, Tokushima 770-8502
[3]Graduate School of Science, Tokyo Metropolitan University, Hachioji, 192-0397

Vortex lattice in the filled skutterudite compound $PrOs_4Sb_{12}$ has been studied by scanning tunneling microscopy (STM) and spectroscopy (STS). The magnetic field H was applied along [001] and [111] directions and STM/STS studies were performed at temperature of 0.4 K. Single crystals of $PrOs_4Sb_{12}$ were cracked at liquid helium temperature in order to prepare the clean surface. Although the samples were mounted on the STM in order to study the (001) and (111) planes, the obtained surfaces have angles about 30° from the plane. On the tilted surface we sometimes observed microstructures which represent the crystal structure of $PrOs_4Sb_{12}$. We have succeeded in observing vortex lattice at fields from 0.2 T to 1.4 T in each field direction. In the fields for $H \parallel [001]$ the vortex lattice is rhombic. The orientation is fixed to one of crystal axis, which can be explained by the T_h crystal symmetry of $PrOs_4Sb_{12}$. The vortex lattice geometry changes from rhombus to square gradually as the magnetic field is increased. In the fields for $H \parallel [111]$ the vortex lattice is triangular at 0.2 T. As the magnetic field is increased, the vortex lattice does not change its shape and rotates. The rotation of vortex lattice takes only one direction, which can be also explained by the T_h crystal symmetry of $PrOs_4Sb_{12}$.