(PS51)

X-Ray Diffraction Study for UIr under Quasi-Hydrostatic Pressure

T. Akazawa[1], H. Hidaka[2], A. Hori[2], S. Fukushima[2], H. Kotegawa[2], T. C. Kobayashi[2], K. Takeda[3], Y. Oishi[4], E. Yamamoto[5], Y. Haga[5], R. Settai[6] and Y. Ōnuki[5,6]

[1]Faculty of Maritime Sciences, Kobe University, Hyogo 658-0022
[2]Faculty of Science, Okayama University, Okayama 700-8530
[3]Faculty of Integrated Arts and Sciencies, Tokyo University of Science, Yamaguchi 756-0884
[4]Japan Synchrotron Radiation Research Institute, Hyogo 679-5198
[5]Advanced Science Research Center, JAERI, Ibaraki 319-1195
[6]Graduate School of Science, Osaka University, Osaka 560-0043

At ambient pressure, UIr have a monoclinic crystal structure (space group $P2_1$) without inversion symmetry. The magnetic property is an Ising-like ferromagnet with a Curie temperature $T_{C1} \sim 46$ K. Recently our group has found pressure-induced superconductivity in UIr.[1)] The superconductivity emerges in a narrow pressure range around the ferromagnetic quantum-critical-point $P_{C3} \sim 2.6$. In order to obtain information on the Cooper pair symmetry, we have performed X-ray powder diffraction measurements for UIr under quasi-hydrostatic pressure up to 3.1 GPa. The measurements were carried out at the BL10XU in the SPring-8 with the approval of JASRI.

Figure 1 shows X-ray diffraction patterns at room temperature under pressures. The lattice parameters continuously decrease with increasing applied pressure ($1/a \cdot \partial a/\partial P = -1.2 \times 10^{-3}$/ GPa, $1/b \cdot \partial b/\partial P = -3.9 \times 10^{-3}$ GPa, $1/c \cdot \partial c/\partial P = -1.5 \times 10^{-3}$ GPa). Moreover, a signature of the occurrence of a structural-transition by applying pressure can not be observed from the diffraction patterns in the experimental resolution. These results strongly suggest that the Cooper pair does not possess inversion symmetry.

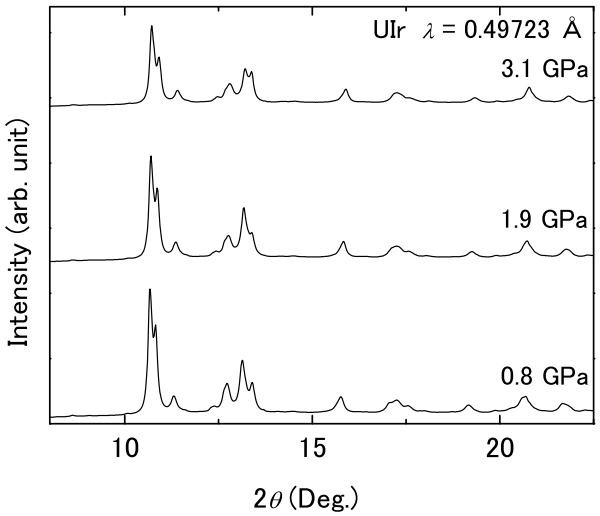

Figure 1: X-ray diffraction patterns of UIr under quasi-hydrostatic pressures up to 3.1 GPa

1) T. Akazawa *et al.*: J. Phys. Soc. Jpn. 73 (2004) 3129.