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Pressure-induced superconductivity in non-stoichiometric bismuth telluride $Bi_{35}Te_{65}$ MARI EINAGA, Graduate School of Science and Technology, Niigata Univ., AYAKO OHMURA, Center for Transdisciplinary Research, Niigata Univ., FUMIHIRO ISHIKAWA, Department of Physics, Niigata Univ., ATSUKO NAKAYAMA, Center for Transdisciplinary Research, Niigata Univ., YUH YAMADA, Department of Physics, Niigata Univ., SATOSHI NAKANO, AKIYUKI MATSUSHITA, NIMS, SHIGEKI TANAKA, TOMOKO KAGAYAMA, KYOKUGEN, Osaka Univ. — Stoichiometric bismuth telluride (Bi_2Te_3), which is a p-type semiconductor, has the rhombohedral structure with space group R-3m at ambient condition. We have previously reported that pressure-induced superconductivity of stoichiometric p-type Bi_2Te_3 occurs in the high-pressure phases which appear above 8 GPa. The transport properties of Bi_2Te_3, however, depend on the atomic composition; the dominant charge carriers change from hole to electron above 63at.% Te. In this study, we performed the electrical resistivity measurement and the x-ray diffraction study of non-stoichiometric n-type $Bi_{35}Te_{65}$ under high pressure to investigate pressure-induced superconductivity and structural phase transition. $Bi_{35}Te_{65}$ has also the R-3m structure at ambient condition. It remains stable up to 9 GPa at room temperature. The superconducting transition is observed at 6 GPa below 2.9 K. There is no obvious anomaly indicating structural phase transition in both pressure dependence of the electrical resistivity at pressures up to 6 GPa and temperature dependence of it at 6 GPa. It suggests that the superconducting transition at 6 GPa of $Bi_{35}Te_{65}$ occurs in the R-3m structure.

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