

Study of topological nature of superconducting and normal states of RhPb₂

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Recently, RhPb₂ was reported to be as a candidate of topological superconductor from the result of band calculation [1]. However, there has been so far no attempt to test it experimentally. According to the Rh-Pb binary phase diagram [2] the intermetallic compound RhPb₂ grows through peritectic reaction incongruently from the melt between 320 °C and 640 °C. We have tried to grow the single crystal by using the vertical pulling mechanism in a mirror furnace. It is clearly found that many single crystallites with a thin, long plate-like shape grow from the melt of RhPb₄. The preliminary X-ray diffraction analysis showed that the structure is similar to the β -PdBi₂ with the tetragonal symmetry with lattice parameters of $a=3.40$ Å and $c=12.82$ Å. In order to study the superconducting topological nature of RhPb₂, we perform the resistivity, the critical currents, the critical fields H_{c1} and H_{c2} measurements.

[1] J. F. Zhang *et al.*, Phys. Rev. **B99** (2019) 045110.

[2] “Phase Equilibria, Crystallographic and Thermodynamic Data of Binary Alloy, Pb-Rh (Lead-Rhodium)”, Landolt-Börnstein -Group IV Physical Chemistry **5I** (1998).