

Physical properties of the bulk-superconducting $\text{Cu}_x\text{Bi}_2\text{Se}_3$

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The search for a topological superconductor has recently been an intriguing issue. To date, the most well-known candidate for the topological superconductor is $\text{Cu}_x\text{Bi}_2\text{Se}_3$, in which the copper is intercalated into the three-dimensional topological insulator Bi_2Se_3 .¹ However, due to an instability of the samples in the air, it was difficult to reveal intrinsic physical properties in the system. In the present work, we improved the sample preparation process and succeeded in obtaining high-quality $\text{Cu}_x\text{Bi}_2\text{Se}_3$ crystals.² The zero resistivity is robustly observed in our samples, and the temperature dependence of the specific heat shows a jump at the superconducting transition. The fully-opened superconducting gap is suggested from the temperature dependence of the specific heat, and thus the result qualifies this system as a strong candidate for a topological superconductor.

¹Y.S. Hor, et al., Phys. Rev. Lett., **104**, 057001, (2010).

²M. Kriener, K. Segawa, Z. Ren, S. Sasaki and Y. Ando, Phys. Rev. Lett., **106**, 127004, (2011).