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Magnetic properties and superconductivity of nano-width crystallite interfaces of bicrystals and tricrystals of Bi_{1-x}–Sb_x ($x \leq 0.2$) alloys

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Abstract

The magnetic properties of bicrystals and tricrystals of Bi_{1-x}–Sb_x ($x \leq 0.2$) alloys were studied in a temperature range of 1.8–100 K. The ferromagnetic-like hysteresis loops are found in tricrystals and some bicrystals. We revealed that nano-width crystallite interfaces (~100 nm) exhibit superconducting behavior, whereas the single crystalline samples are not superconducting. The onset of superconducting transition (~ 36 K) in some of these interfaces considerably exceeds the values of other semimetal nanoobjects.