Coexistence of Superconductivity and Magnetism in Intermetallic $NiBi_3$

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$NiBi_3$ polycrystals were synthesized via a solid state method. X-ray diffraction analysis shows that the main phase present in the sample corresponds to $NiBi_3$ in a weight fraction of 96.82 % according to the refinement of the crystalline structure. SEM - EDS and XPS analysis reveal a homogeneous composition of $NiBi_3$, without Ni traces. The powder superconducting samples were studied by performing magnetic measurements. The superconducting transition temperature and critical magnetic fields were determinated as $T_C = 4.05$ K, $H_{C1} = 110$ Oe and $H_{C2} = 3{,}620$ Oe. The superconducting parameters were $\xi_{GL}=$ 301.5 $\mathring{A}$, $\lambda_{GL}=$ 1549 $\mathring{A}$, and $\kappa=$ 5.136. Isothermal measurements below the transition temperature show an anomalous behavior. Above the superconducting transition the compound presents ferromagnetic characteristics up to 750 K, well above the Ni Curie temperature.