Structural and magnetic behavior of the LPT MnBi phase

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The Low Temperature (LTP) MnBi phase is very attractive as a permanent magnet, due to its large magnetocrystalline anisotropy ($K$ of 107 erg/cm$^3$), relatively high magnetization and most of all due to its positive temperature coefficient of coercivity. The synthesis of the (LTP) MnBi single phase has proven to be a difficult task. In our study the MnBi ingot was prepared by arc melting under a purified Ar atmosphere and annealing at 400 °C for 10 to 72 hours. X-ray diffraction patterns showed that the resulting samples had a high concentration (more than 80%) of LTP MnBi phase. Some traces of Mn and Bi were also visible in XRD. Magnetic measurements at 300 K indicate that the coercivity is highly dependent on the microstructure of the samples, as the coercive field ($H_c$) increases from 0.03 T (in the bulk samples) to 0.3 T in ground samples.

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