

Magnetic properties of large-scaled MnBi bulk magnets

Sumin Kim^{*}, Hongjae Moon, Hwaebong Jung, Hyun-Sook Lee[†] and Wooyoung Lee[†]

Department of Materials Science and Engineering, Yonsei University,
262 Seongsanno, Seodaemun-gu, Seoul 120-749, Korea

[†]Corresponding Authors Email: wooyoung@yonsei.ac.kr, h-slee@yonsei.ac.kr

We investigated the magnetic properties of large, compacted, sintered MnBi bulk magnets with dimensions of $20.3 \times 15.3 \times 10.3$ mm³. To obtain high content of the low-temperature-phase (LTP) of MnBi in the precursor powders, a new process was implemented and produced about 98 wt% of LTP. To improve the coercive field of MnBi, particle sizes were controlled using different milling techniques. The dependence of magnetic properties of the bulk magnets on the particle size was analyzed. The highest maximum energy product, $(BH)_{\max}$, obtained among our samples was 7.3 MGOe. This is the first report of demonstrating high performance in large-sized MnBi bulk magnets.

Keywords: rare-earth-free permanent magnet, MnBi, bulk magnet, melt spinning, hot compaction