

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Fabrication and Characterization of MnBi/Co and MnBi/FeCo Nanocomposite Bulk Magnets NARAYAN POU DYAL, KINJAL GANDHA, WEI WANG, XIAOTONG LIU, ZHAOGUO QIU, KEVIN ELKINS, J PING LIU, Department of Physics, the University of Texas at Arlington, Texas 76019, USA, JUN CUI, Energy and Environment Directorate, Pacific Northwest National Laboratory, Richland, Washington 99352, USA, DEPARTMENT OF PHYSICS, THE UNIVERSITY OF TEXAS AT ARLINGTON, TEXAS 76019, USA TEAM, ENERGY AND ENVIRONMENT DIRECTORATE, PACIFIC NORTHWEST NATIONAL LABORATORY, RICHLAND, WASHINGTON USA COLLABORATION — We report the fabrication of MnBi/Co and MnBi/FeCo nanocomposite bulk magnets by consolidating the hard and the soft phase powder particles under a magnetic field followed by subsequent sintering process. The anisotropic micro and submicron hard magnetic MnBi particles were first prepared by low energy cryo ball milling at liquid nitrogen temperature. MnBi/Co and MnBi/FeCo nanocomposite powders were then prepared by using different fraction of chemically synthesized Co nanowires and FeCo nanoparticles as the soft magnetic phase. The saturation magnetization (M_s) of the composite magnets increases with addition of the soft phase while the coercivity first increases and then decreases. The MnBi/Co and MnBi/FeCo nanocomposite bulk magnets have reached an enhanced magnetization value ($M_s = 78$ and 80.6 emu/g) with 30 wt. % of Co nanowires and FeCo nanoparticles, respectively compared to the single phase MnBi bulk magnet ($M_s = 52$ emu/g).

Narayan Poudyal
Department of Physics, the University of Texas at Arlington, Texas 76019, USA

Date submitted: 13 Nov 2014

Electronic form version 1.4