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High energy product of Sm_2Co_7/FeCo nanocomposites prepared by severe plastic deformation NARAYAN POUDYAL, CHUANBING RONG, J. PING LIU, Department of Physics, University of Texas at Arlington, Arlington, TX 76019, USA, YING ZHANG, M.J. KRAMER, Division of Materials Science and Engineering, Ames Laboratory, Iowa State University, Ames, IA 50011, USA — Nanocomposite magnets, consisting of exchange coupled hard magnetic and soft magnetic phases exhibit enhanced remanent magnetization and therefore high energy product $(BH)_{max}$. In addition to the high performance, nanocomposites magnets are of commercial interest because the alloys require less expensive rare-earth elements. Here, we report Sm_2Co_7+ x wt % FeCo (x = 0 to 50) nanocomposites prepared by high energy ball-milling and subsequent heat treatments. The evolution of structure and magnetic properties with soft phase fraction was systematically studied. Effect of the soft phase composition Fe_{100-X} Co_X (x = 20, 35 and 50) was also investigated. Microstructural studies by energy filter transmission electron microscopy revealed a homogeneous distribution of -Fe phase in the matrix of hard magnetic Sm-Co phase with grain size less than 20 nm after severe plastic deformation. Enhanced remanence and $(BH)_{max}$ (up to 17 MGOe) in the nanocomposites with 40 % of the soft phase are obtained.

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