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High-temperature performance of bulk nanocomposite $SmCo_5$/-Fe(Co) magnets CHUANBING RONG, NARAYAN POUDYAL, 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 — Permanent magnetic materials capable of operating at elevated temperatures are highly required for advanced power systems. In this work, a new processing technique has been adopted to produce $SmCo_5$-based bulk nanocomposite magnets with high thermal stability. The processing consists of severe plastic deformation and warm compaction. The structure and high-temperature magnetic property characterizations show that the microstructure does not change with heating temperature up to 500 °C which ensures effective inter-phase exchange coupling at elevated temperature. It was also found that the thermal stability of the bulk nanocomposite magnets can be significantly improved with increasing density (decreasing porosity). The room temperature energy product drops fast with heating temperature above 300 °C for the magnets with 80% density, and with minimum decrease for the magnets with full density. Energy product about 11.1 MGOe can be obtained at 300 ^{o}°C in the fully dense isotropic bulk $SmCo_5$/Fe nanocomposite magnets.

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