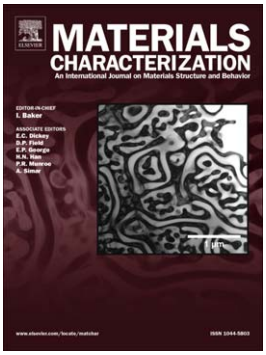

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$HoFe_3$ magnetic nanopowders fabricated by high energy ball milling

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Abstract

The study of microstructure and magnetic properties of bulk and ball – milled $HoFe_3$ intermetallic compounds were presented. The influence of the *high energy ball - milling* (HEBM) parameters i.e. applied milling time on the final size of particles/crystallites was confirmed by a variety of complementary measurement methods. The presence of the main 1:3 type of crystal phase ($PuNi_3$) was evidenced for bulk crystalline and powders specimens. The emergence of a partly amorphous phase was confirmed at the end of HEBM process (t = 80 h). The formation of nanoflakes with their thickness dependent on various milling time periods was revealed by various techniques. An emergence of agglomerates was observed for the extended pulverization duration. The non – linear variation of magnetic parameters was evidenced across milling. Furthermore, a slight exchange bias phenomenon was noticed for as – milled powders. In the comparison between ^{54}Fe Mössbauer spectra for the bulk compound and selected as-milled powders an emergence of a paramagnetic component was revealed. A