Fabrication of Ni$_{50}$Mn$_{34}$In$_{16}$ ferromagnetic shape memory alloy using mechanical alloying method and study of annealing effect on its structural and magnetic properties

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Abstract

In this research, Ni$_{50}$Mn$_{34}$In$_{16}$ ferromagnetic shape memory alloy has been prepared by mechanical alloying method. XRD patterns of the samples showed that after 10 hours of ball milling, the alloy structure was completely formed and continuing of the milling process led to more fine particle size. Also the role of annealing on improvement of the alloy properties was studied. It was found that the sample annealing at 900$^\circ$C followed by quenching improves the crystal structure and helps to reach L2$_1$ structure. Ac susceptibility measurements showed that for the occurrence of magnetic transition, annealing and quenching process on the ball milled powder is necessary.

Keywords: annealing, ferromagnetic shape memory, mechanical alloying, quenching

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