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The investigation structural and magnetic properties at high temperature of nanostructured Fe-Mg alloys produced by mechanical alloying

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A systematic study on the structural and magnetic properties of Fe(100−x) Mgx alloys (10<x <45 wt. %) obtained by mechanical alloying is presented. Elemental powders of Fe and Mg mixed in an adequate weight ratio were milled at room temperature in a shaker mixer mill using vials and balls of hardened steel as milling media with a ball: powder weight ratio of 14:1. The mixtures were milled for 24 h. The prepared powders were characterized using differential thermal analysis (DSC), X-ray diffraction technique (XRD) at high temperature, transmission electron microscopy (TEM), and the vibrating sample magnetometer (VSM). Obtained results are discussed according to the rate of Mg. XRD at high temperature results also indicated that when the milling time increases, the lattice parameter and the mean level of grain size increase, whereas the microstrains decrease. The result of the observation by the TEM of the Fe-Mg powders prepared in different milling time, coercive fields derived, and saturation magnetization derived from the hysteresis curves in high temperature are discussed as according to the rate of Mg.

Biography

A El Mohri has completed her PhD in Mechanical Engineering option Materials Science 2015-2016, on "Contribution to the study of Fe-Mg iron-based nano-materials, elaboration and characterization" from the Department of Mechanical Engineering, University of Houari Boumediene Bab ezzouar (USTHB), Algiers. She Magister in Mechanical Engineering option Materials Science 2000-2001 from Mechanical Engineering Institute, Department of Materials Science (SDM), University of Blida. She studies the problems of pitting defects in cast steel (subject of casting and casting). She has done her Diploma in Mechanical Engineering option SDM 1993-1994 from Mechanical Engineering Institute, SDM Department, University of Blida.

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