

Magnetic, microstructure characterization of Fe₆₅Co₃₅ nanocrystalline alloy synthesized by mechanical alloying process

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Abstract

An investigation was conducted to explore the applicability of magnetic and microwave techniques to characterize grains size variation during mechanical alloying. A series of Nanocrystalline Fe₆₅Co₃₅ samples have been prepared, these structures are prepared using mechanical alloying based on planetary ball mill under several milling conditions. Mechanical alloying is a non-equilibrium process for materials synthesis. The structural effects of mechanical alloying of powders were investigated by X-Ray diffraction analysis, microwaves and VSM magnetic technique. Consequently, alloy powder with an average grain size about of 8 nm was obtained. Experimental results show that fine nanocrystalline alloy powders prepared by mechanical milling are very promising for microwave applications.

Keywords: Fe-Co powder; Mechanical alloying; Magnetic properties; Microwave.