

Eddy Current and Microwave Characterization of (Fe₆₅,Co₃₅)₇₀Al₃₀ Nanocrystalline Alloy Synthesized by Mechanical Alloying Process

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Abstract : An investigation was conducted to explore the applicability of eddy current and microwave techniques to characterize grains size variation during mechanical alloying. A series of Nanocrystalline (Fe₆₅Co₃₅)₇₀Al₃₀ 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 eddy current 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. It is suggested that eddy current measurement technique is a useful tool for the characterization of Nanocrystalline materials.

Keywords : Fe-Co powder, Mechanical Alloying, Magnetic Properties, Microwave