

EDDY CURRENT CHARACTERIZATION OF (Fe₆₅Co₃₅)_xAl_{1-x} NANOCRYSTALLINE ALLOY SYNTHESIZED BY MECHANICAL ALLOYING PROCESS

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Abstract : An investigation was conducted to explore the applicability of eddy current and magnetic techniques to characterize grains size variation during mechanical alloying and the formation the new mixture due to the variation of crystallography parameters. The change in apparent density was attributable to the irregular particles of the metal powders. A series of Nanocrystalline (Fe₆₅Co₃₅)_xAl_{1-x} 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, SEM, microwaves, hysteresis magnetic 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 : Eddy current, Fe-Co powder, Mechanical alloying, Magnetic properties, Microwave.