

# Eddy Current and Microwave Characterization of (Fe<sub>65</sub>,Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> 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 (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> 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