

# Characterization and corrosion behavior of (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> nanostructure alloys obtained by mechanical alloying

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**Abstract :** In this work, the structure and corrosion properties of formation nanostructure alloys (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> are investigated. A series of Nanocrystalline (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> samples have been prepared using mechanical alloying based on planetary ball mill under several milling conditions. Mechanical alloying is a non-equilibrium process for materials synthesis. The structure obtained by mechanical alloying were investigated by scanning electron microscopy, X - Ray diffraction analysis, magnetic technique VSM and corrosion study. Consequently, alloy powder with an average grain size of 8 nm was obtained. The polarization and impedance curves of different samples in NaCl media showed the corrosion potential and corrosion resistance values increases with milling time (crystallite size). Experimental results show that fine nanocrystalline (Fe<sub>65</sub>Co<sub>35</sub>)<sub>70</sub>Al<sub>30</sub> alloy powders prepared by mechanical milling have an interesting properties very promising for corrosion and magnetic applications.

**Keywords :** Fe-Co-Al Powder, Mechanical Alloying, Magnetic Properties, corrosion