

## Study of the Nanostructured Fe<sub>50</sub>Cr<sub>35</sub>Ni<sub>15</sub> Powder Alloy Developed by Mechanical Alloying

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**Abstract :** Nanostructured Fe<sub>50</sub>Cr<sub>35</sub>Ni<sub>15</sub> alloys were prepared from pure elemental powders using high energy mechanical alloying. The mixture powders obtained are characterized by several techniques. X-ray diffraction analysis revealed the formation of the Fe<sub>1</sub>Cr<sub>1</sub> compound with BCC structure after one hour of milling. A second compound Fe<sub>3</sub>Ni<sub>2</sub> with FCC structure was observed after 12 hours of milling. The size of crystallite determined by Williamson Hall method was about 5.1 nm after 48h of mill. SEM observations confirmed the growth of crushed particles as a function of milling time, while the homogenization of our powders into different constituent elements was verified by the EDX analysis.

**Keywords :** Fe-Cr-Ni alloy, mechanical alloying, nanostructure, SEM, XRD

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