

Magnetic and structural Behavior of Fe-CoO Nanocomposites Mechanically Milled

A.Younes, M.Khorchef, A.BOUAMER, H.Amar

Abstract: The Fe₆₀(CoO)₄₀ nanostructured alloys have been prepared from pure iron and cobalt oxide powders by mechanical alloying technique within a high energy planetary ball-mill. Morphology, microstructural and magnetic properties of this powder were investigated by a Scanning Electron Microscope (SEM), X-ray diffraction (XRD) and Vibrating sample magnetometer (VSM). The effect of time of milling on magnetic behaviour of Fe(CoO) nanostructured composite has been investigated. Apparition of new phase polycrystalline sample having a size in the range of 12 and 26 nm, it is confirmed by X-ray diffraction testing. The enhanced magnetic properties and structural behaviour of the nanoparticle are due by the diminution of size of crystallite. After 40 hours of milling, the appearance of spinel structure of CoFe₂O₄. The reduction in particle size leads to a significant increase in magnetic hardening, the coercive field at room temperature increases from 6 Oe to 208 Oe.

Keywords : Fe₆₀(CoO)₄₀ nanostructured alloys, Mechanical Alloying, Magnetic Properties