Micro-Structure Characterization by MicroMagnetic Methods

M. Zergoug, A. Haddad, O. BOURDJAM, z

Abstract : The quality control of industrial components requires adaptation and thedevelopment of new material characterization and particular non destructive testingtechniques. To characterize a steel, it would be useful to know its chemicalcomposition, physico-chemical constitution, metallurgical state (annealed,hammered) and others parameters (superficial and chemical processing ...).The testing method using Barkhausen noise (B.N.) is a particular method, which canbe applied on ferromagnetic materials. It is a magnetic non destructive evaluation(NDE) method and can provide very important information on the materialmicrostructure. The using of the NDT method gives lot information about these nanostructures inparticular the magnetic NDT techniques. In this paper, we examine the contributionof micromagnetic techniques in-the characterisation of nanostructure materials.Nanocrystalline Fe(1-x) Cox , Fe ,Fe-Co-Cu mixtures have been prepared bymechanical alloying using a planetary ball mill under several milling conditions.Data analysis showed that the technique of the corrective field, the residualmagnetisation, saturation moment and the eddy current was in relation with timemilling of these powders(in our case Fe Ni) .

Keywords : NDT, Barkhausen noise, FFT, remanence, corecitivity, micro defect. nanostructure