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MICROSTRUCTURAL AND THERMAL PROPERTIES OF NANOCRYSTALLINE FE POWDERS

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Abstract : The microstructural evolution and thermal properties of nanocrystalline Fe during mechanical milling were investigated by using quantitative X-ray diffraction and thermal analysis techniques. Upon milling of the Fe powders with coarse grains, grain refinement takes place gradually and a steady-state grain size in the nanometer regime (about 13,8 nm) is reached after a certain period of milling. the paramagnetic nanostructured bcc α -Fe domain is extended by about 50°C at the expense of both the magnetic bcc α -Fe and nonmagnetic fcc γ -Fe as compared to coarse grained bcc α -Fe

Keywords : Nanomaterials ; Iron; Microstructure; Thermal properties