
CRYSTALLIZATION PROCESS AND MAGNETIC PROPERTIES OF Fe-RICH NANOCRYSTALS EMBEDDED ON AMORPHOUS MAGNETIC RIBBONS

Peixoto, E. B.^{2*}; Mecena, S. G.¹; Silva, L. S.²; Fabian, F. A.²; Meneses, C. T.²; Duque, J. G. S.²

¹Dep. de Física, Campus prof. Aluísio de Campos, UFS, São Cristóvão, SE, Brazil

²Dep. de Física, Campus prof. Alberto Carvalho, UFS, Itabaiana, SE, Brazil

*erilainepeixoto@gmail.com

In this work we use thermal analysis methods, X-ray diffraction and magnetization measurements to carry out a systematic study on amorphous magnetic materials. In this sense, as-quenched amorphous samples of $\text{Ni}_{40}\text{Fe}_{40}\text{P}_{14}\text{B}_6$ and $\text{Fe}_{76.5}\text{Cu}_1\text{Nb}_3\text{Si}_{13.5}\text{B}_6$ were used. We have interpreted the crystallization kinetics in terms of the Johnson/Mehl/Avrami (JMA) nucleation-growth model. X-ray diffraction data as function of temperature reveal that our samples consist of single phases of Fe-rich nanocrystals embedded in a residual amorphous phase. Magnetic measurements as function of temperature show a sharp decreases of the magnetization around 200 and 350°C to $\text{Ni}_{40}\text{Fe}_{40}\text{P}_{14}\text{B}_6$ and $\text{Fe}_{76.5}\text{Cu}_1\text{Nb}_3\text{Si}_{13.5}\text{B}_6$, respectively, likely related to the Curie temperatures. TGA and magnetization curves show additional increases in the high temperature region which are attributed to the growth of the Fe-rich magnetic phases.