AFM AND MÖSSBAUER SPECTROMETRY INVESTIGATION OF CRYSTALLIZATION PROCESS IN Fe-Mo-Cu-B ALLOY

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In this paper, the effect of temperature annealing on the development of surface nanocrystallization of the $Fe_{79}Mo_8Cu_1B_{12}$ alloy is investigated. The surface morphology is examined using tapping mode atomic force microscopy (AFM). The results are compared with those obtained by means of transmission Mössbauer spectroscopy, CEMS and XRD. It was found that the sample is not fully amorphous even in the as-quenched state. Minor amounts of bcc-Fe grains were detected. AFM results indicate large variations in morphology of density and size of surface protrusions. They are different at the top- (air side) and bottom-(wheel) side of the ribbon. The amount and size of nanocrystals increases with annealing temperature. The onset of the first crystallization is observed after annealing at 410 °C when bcc-Fe nanograins (ca. 15 nm in size) are much better developed. More intense growth is evidenced at higher temperatures. The second crystallization which is characterized by occurrence of additional crystalline phases appears after annealing at 650 °C.

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