Formation of Nanocrystalline Structure in Selected Rapidly Quenched Fe-Sn-B Based Alloys

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Abstract. Formation of amorphous and nanocrystalline phases has been investigated in rapidly quenched Fe-Sn-B based alloys with Co/Fe substitution and additions of small amount of Cu. Short ribbon-shaped samples were prepared by planar flow casting and subsequently annealed in the regions of phase transformations determined by differential scanning calorimetry. Structure analysis has been performed on as-quenched and annealed samples using X-ray diffraction and transmission electron microscopy. The results show a dependence of lattice parameter of primary bcc-Fe(Co) phase with proceeding nanocrystallization and indicate supersaturation of this phase with Sn; this effect and the size evolution of nanocrystalline grains is correlated with observed magnetic properties. Presented research is partially supported by projects Stimuli HEES4T, MAGSAT, APVV-15-0621 and VEGA 2/0082/17.