

Amorphous and nanocrystalline soft magnetic FeCuNbSiB/CoSiB bilayer ribbons

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Magnetic bilayer composites are attracting a great deal of scientific interest from both fundamental and application points of view. Bilayer ribbons studied in this work have been prepared by planar flow casting from a single crucible with two nozzles close to each other and with a partition between them forming two separate vessels. Such arrangement allowed us to obtain bilayer with two homogeneous amorphous layers and contact interlayer between them having submicron thickness. The composition of the individual layers was chosen from the FeCuNbSiB and CoSiB alloy systems. A controlled heat treatment was used in order to transform the FeCuNbSiB layer into the nanocrystalline state. The magnetization and magnetic reversal processes before and after nanocrystallization were investigated in a wide temperature range. We have shown that magnetic reversal process in such bilayers is strongly influenced by interlayer stresses, which are induced in material due to different thermal expansion coefficients of two mechanically solid connected individual layers.