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Microstructure refinement in $Nd_2Fe_{14}B$/(Fe,Co) nanocomposite ribbons produced by melt-spinning in a magnetic field VUONG VAN NGUYEN, CHUANBING RONG, J. PING LIU, Department of Physics, University of Texas at Arlington, Arlington, TX 76019, USA — $Nd_2Fe_{14}B$/(Fe,Co) ribbons were prepared by melt-spinning in a magnetic field perpendicular or parallel to the wheel surface. The starting alloy $Nd_{15}Fe_{77}B_8$ was mixed with soft magnetic Fe, or Co, or $Fe_{65}Co_{35}$. The amount of the soft phases was varied from10 to 40 wt.% of the hard phase. The wheel was reconstructed to provide the surface magnetic fields in the range of 1 to 4 KG perpendicular or parallel to the wheel surface. The obtained results show that grain size in the ribbons was significantly reduced while the texture was enhanced. The mechanism remains to be fully understood, though it may be related to a change of the C-shaped diagram. The observed results suggest that a magnetic field can be used to control and optimize microstructures of nanocomposite ribbons. The effect of field strength and configuration is also discussed in details.

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