

Abstract Submitted  
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**Effect of morphology on exchange bias in NiMnSn and NiCoMnIn magnetic shape memory alloys**<sup>1</sup> PAVEL N. LAPA, JAMES A. MONROE, BRIAN E. FRANCO, IBRAHIM KARAMAN, IGOR V. ROSHCHIN, Texas A&M University — Exchange bias (EB) is one of puzzling magnetic properties of magnetic shape memory alloys (MSMA). Despite a few attempts to explain the mechanism, there is no comprehensive model describing it. The main obstacle is the lack of information about the magnetic structure of martensitic and austenite phases. In contrast to classical EB systems where the exchange coupling happens at the interface between ferromagnetic and antiferromagnetic layers, the EB in MSMA is attributed to coexistence of ferromagnetic and antiferromagnetic regions. We report the results of structural analysis obtained using wavelength-dispersive X-ray spectroscopy (WDS) and magnetic characterization of these samples. We observe a correlation of EB with the secondary heat treatment for NiCoMnIn alloys. Comparative first order reversal curve (FORC) analysis for NiMnSn samples with different heat treatment suggests a correlation between morphology and distribution of exchange bias values. Additionally, exchange bias in these alloys can be induced even after zero-field cooling by applying a constant field for 2 hours before measuring the magnetization curve. This behavior is consistent with magnetic glassiness observed in these alloys at low temperatures.

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