Abstract Submitted
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The impact of substrate stimulated functional interface on magnetic and magneto-transport signature of martensitic transformation in NiMnIn shape memory alloy[1] R. SABIRIANOV, University of Nebraska Omaha, A. SOKOLOV, University of Nebraska Lincoln, E. KIRIANOV, A. ZLENKO, Lincoln South West High School, A. QUETZ, A. ARYAL, S. PANDEY, I. DUBENKO, N. ALI, Southern Illinois University, S. STADLER, Louisiana State University, N. AL-AQTASH, Hashemite University — We study the impact of the substrate on the martensite transformation of Ni-Mn-In thin films by Hall resistance measurements and discuss it using density functional theory calculations. Similarly to the bulk systems, thin films grown on MgO exhibit the martensitic transformation accompanied by large magnetoresistance and a sign reversal of the ordinary as well as anomalous Hall coefficient. Martensite transition temperature of films grown on (100) surface of MgO is near 170K, while the films grown on (111) surface of MgO show the change of Hall coefficient at 110K. The calculated total energy difference between FM austenite and FiM martensite states in $Ni_2Mn_{1.5}In_{0.5}$ film on MgO (001) substrate (with Ni/MgO interface) is 0.20eV per NiMnIn f.u, compared to 0.24eV in the bulk at the same equilibrium lattice parameters, i.e. when film is "unstrained". When lattice parameters of $Ni_2Mn_{1.5}In_{0.5}$/MgO are of those of MgO substrate, i.e. when the film experiences strong bi-axial tensile strain $\Delta a/a$ =2.4%, the energy difference is 0.08eV per NiMnIn f.u. These results clearly indicate strong interplay between lattice strain/stress and the relative stability martensite and austenite phase

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