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Superparamagnetism in the martensitic phase of the magnetic shape-memory alloys $Ni_{50-x}Co_xMn_{40}Sn_{10}$ SHAOJIE YUAN, Florida state univ ,National High Magentic Lab, PHILIP KUHNS , MICHAEL HOCH, NHMFL, JAMES BROOKS , Florida state univ ,National High Magentic Lab, ARNEIL REYES , NHMFL, VIJAY SRIVASTAVA , Aerospace Engineering and Mechanics, university of Minnesota, DANIEL PHELAN, Aerospace Engineering and Mechanics at university of Minnesota, RICHARD JAMES , CHRIS LEIGHTON, Chemical Engineering and Materials Science at university of Minnesota, NHMFL TEAM, UNIVERSITY OF MINNESOTA TEAM — The Ni-Mn based shape magnetic memory alloys have attracted considerable attention because of their interesting magnetic properties, including intrinsic superparamagnetism and intrinsic exchange-bias effects, which are found in the martensitic phase of these materials. Here, we report on the results of zero-field ^{55}Mn NMR measurements made on the alloys $Ni_{50-x}Co_xMn_{40}Sn_{10}$ with x=7 and x=14. The results show that Co substitution not only changes the electronic configuration of a fraction of the Mn ions but also alters the magnetic interaction amongst these ions, leading to marked changes in the low temperature antiferromagnetic and ferromagnetic components compared to x=0. For both x=7 and x=14 our analysis shows that the Mn ions form a new ferromagnetic nanoclusters in small Co rich regions of the sample. Based on the temperature dependence of the NMR spectral features, we propose a method to estimate the superparamagnetic cluster size distribution.

Shaojie Yuan
Florida State Univ

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