Abstract Submitted
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Magnetic, Electrical and Structural study of Mn-Co-Sn Heusler Nanomaterials[1] YUNG HUH, P. KHAREL, A. NELSON, Physics, South Dakota State University, SD 57007, V. SHAH, R. SKOMSKI, D. SELLMYER, NCMN, University of Nebraska, Lincoln, NE 68588 — The nano-structured $Mn_{3-x}Co_xSn$ (x = 0, 0.3, 0.5, 0.7, 1.0) alloys were prepared using arc-melting, melt-spinning and thermal annealing. Mn_3Sn is stable in the hexagonal structure and it shows an antiferromagnetic spin order at room temperature. $Mn_{3-x}Co_xSn$ alloys maintained a hexagonal structure upon substituting Mn with Co up to x = 0.7, and then it transformed to cubic phases at x = 1.0. At room temperature $Mn_{3-x}Co_xSn$ (x = 0.5, 0.7, 1.0) exhibited ferromagnetic spin order. $Mn_{2.3}Co_{0.7}Sn$ sample showed Curie temperature of 640 K. However, the transition temperatures are suppressed to 600 K for $Mn_{2.5}Co_{0.5}Sn$ and $Mn_{2.0}Co_{1.0}Sn$. The room temperature saturation magnetization measured at 7.0 T increases with increasing amount of Co substitution, varying from 13 emu/g (x = 0.5), 25 emu/g (x = 0.7), and 50 emu/g (x = 1.0), respectively. The electrical resistivity of all the Co-substituted samples depends on temperature and decreases with increasing temperature from 5 K to room temperature. Interestingly, there observed a rapid upturn in the resistivity at 250 K for $Mn_{2.5}Co_{0.5}Sn$.

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Yung Huh
Physics, South Dakota State University, SD 57007

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