Abstract Submitted
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Pulsed Laser Deposition of Thin Films of Binary Compounds of Gd and Si using Femto-Second Laser[1] RAVI HADIMANI, Department of Electrical and Computer Engineering, Iowa State University, YAROSLAV MUDRYK, TIMOTHY PROST, VITALIJ PECHARSKY, KARL GSCHNEIDNER, Materials and Engineering Physics Program, Ames Laboratory, US Dept. of Energy, DAVID JILES, Department of Electrical and Computer Engineering, Iowa State University — Growth of thin films of $Gd_5(Si_xGe_{1-x})_4$ has not been reported widely because of difficulty in obtaining the monoclinic phase that is responsible for the giant magnetocaloric effect. Our previous attempt resulted in multiple phases of the material in the film including oxides of Gd [1]. In this work, we therefore report growth of thin films of binary compounds of Gd and Si with Pt protection on top to prevent the oxidation. We have used femto-second laser that results in finer particle size and a composition closer to the target. Microstructure analysis using SEM, EDS was carried out to determine the film thickness, morphology and composition. Magnetic moment vs. temperature measurements were carried out at an applied field of 1000 Oe. The sample showed a major transition below 150 K and a minor transition around 335 K similar to the bulk sample. Magnetization measurements showed that the magnetization in the film saturated close to a field of 5kOe (0.397MA/m). References: [1] R. L. Hadimani, I. C. Nlebedim, Y. Melikhov, D. C. Jiles, "Growth and characterisation of $Gd_5(Si_xGe_{1-x})_4$ thin film" *J.Appl. Phys.*, 113, 17A935, (2013).

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