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**Pulsed Laser Melting and Resolidification of GeMn Thin Films**

MELISSA DOLPH, WENJING YIN, JIWEI LU, STUART WOLF, University of Virginia, TAESEOK KIM, MICHAEL AZIZ, Harvard University — The effect of pulsed laser melting (PLM) and resolidification on the Group-IV diluted magnetic semiconductor (DMS) GeMn is investigated. (100) Ge thin films of thickness 200nm (the top layer of a Germanium on Insulator Wafer) were ion implanted with Mn at concentrations of 0.5 - 4 atomic %. Mn implantation caused amorphization of the near-surface region of the Ge film as well as the formation of Mn nanoclusters. The studies reported here focus on the use of pulsed laser melting to restore crystallinity in the Ge and to redistribute the Mn more uniformly and increase its substitutionality in the Ge lattice. The single crystal Ge at the interface between the Ge device layer and the SiO<sub>2</sub> acts as a seed layer for single crystal solidification. X-ray diffraction (XRD) data showed a very strong diffraction from (400) Ge at the optimum laser beam fluence. Laser melted films were also found to be ferromagnetic. The effects on the ferromagnetic behavior due to the Mn concentration and post-PLM thermal annealing conditions will also be reported and correlated with transmission electron microscopy (TEM) structure measurements.

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