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High Temperature Seebeck Coefficient and Electrical Resistivity of $Ge_2Sb_2Te_5$ Thin Films LHACENE ADNANE, FARUK DIRISAGLIK, MUSTAFA AKBULUT, University of Connecticut, YU ZHU, CHUNG LAM, IBM T. J. Watson Research Center, ALI GOKIRMAK, HELENA SILVA, University of Connecticut — Phase-change memory (PCM) is a promising memory technology in which a small volume of a chalcogenide material can be reversibly and rapidly switched between amorphous and crystalline phases by an electrical pulse that brings it above crystallization ($\sim$ 150-200 C) or melting ($\sim$ 700 C) temperature. The large temperature levels involved and small dimensions of PCM devices give rise to very large temperature gradients ($\sim$ 10 K/nm and higher) which result in strong thermoelectric effects. High-temperature characterization of the temperature-dependent thermoelectric properties of these materials is therefore critical to understand for the operation of these devices but to date there is only limited experimental data available. We have performed simultaneous measurements of Seebeck coefficient and electrical resistance of thin films of GST with different thicknesses, deposited on silicon dioxide, from room temperature to $\sim$ 600 C, under small temperature gradients. Two-point current-voltage (I-V) measurements were performed using a semiconductor parameter analyzer. The resistance of the material and the Seebeck voltage (open-circuit voltage) are calculated from the slope and intercept of the I-V characteristics. The details of the measurements and S(T) and R(T) results for the GST thin film samples will be presented and discussed.

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