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Impact of preparation conditions on the magnetocaloric properties of Gd thin films H.F. KIRBY, D.D. BELYEA, J.T. WILLMAN, University of South Florida, C.J. HENDRYX, Newsome High School, C.W. MILLER, University of South Florida — The impact of the deposition temperature and gettering were investigated on Ta(5nm)/Gd(30nm)/Ta(5nm) thin films' magneto caloric(MCE) properties. The samples were grown by magnetron at temperatures up to 600 ° C, with and without gettering. Structure of the samples was investigated by X-ray diffraction and ray reflectivity. The isothermal magnetization of the samples was above and below the Curie temperature of the Gd. The entropy change associated with the second order phase was calculated from M(H,T) using the thermodynamic Maxwell. Increasing the deposition temperature generally improves entropy peak (magnitude, FWHM, and temperature of the peak), but leads to significant oxidation. The ungettered sample grown at 00 ° C was purely GdO (111). Gettering the chamber by sputtering Ta the walls of the chamber for 30 minutes prior to deposition this oxidation issue, and increased the relative cooling power RCP) of films grown at elevated temperatures. The RCP values of the sample set were increased by as much as 42% over ungettered. Supported by AFOSR and NSF.

Prefer Oral Session
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