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Irreversibity in Cooling and Heating Processes in the Magnetocaloric MnAs and Alloys[1] A.L. LIMA SHARMA, Dept. Physics, Tuskegee University, Tuskegee, AL 36088, S. GAMA, Dept. of Physics, Univ. Fed. do Est. de Sao Paulo, Rua Prof. Artur Riedel, 275 - Jd. Eldorado - Diadema- SP 00972-270 - Brazil, A.A. COELHO, Inst. de Física Gleb Wataghin, Univ. Est. de Campinas (UNICAMP), C. P. 6165, Campinas, SP 13083-970 - Brazil — Irreversibility of adiabatic processes in the magnetocaloric MnAs and alloys are presented here. We used a differential scanning calorimeter in order to record the heat flux as a function of the temperature and applied field for MnAs, $Mn_{0.994}Fe_{0.006}As$ and $Mn_{0.994}Cu_{0.006}As$. From the measured heat flux, we extracted the latent heat and entropy associated to cooling and heating processes. In the cooling curve, we observed that $S^c_{Mn} > S^c_{Fe} > S^c_{Cu}$, the index c refers to cooling process, similarly, for the heating process: $S^h_{Fe} \approx S^h_{Mn} > S^h_{Cu}$. On the doped samples, the thermomagnetic behavior is compatible with a scenary where Zener's $p-d$exchange mechanism dominates, i.e. the interaction range is weaker but long ranged, because the extended valence hole states mediate the ferromagnetic interaction. The difference of the entropy obtained from cooling and heating process was found to be as high as 37%.

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