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**Enhancement of magnetic refrigerant capacity in nanocrystalline $LaMnO_3$**[1] ANIS BISWAS, SAYAN CHANDRA, M.H. PHAN, H. SRIKANTH, University of South Florida, FUNCTIONAL MATERIALS LABORATORY TEAM — Manganites are considered as potential magnetic refrigerants owing to their large magnetocaloric effect (MCE). However, the effective temperature span of large MCE ($\delta$T) is quite small in their bulk form resulting in small refrigerant capacity (RC). We have studied the magnetocaloric property of $LaMnO_3$in its polycrystalline bulk and nanocrystaline form with particle size $\sim$50nm. MCE is quantified as the change in magnetic entropy (-$\Delta S_M$), which is calculated from the isothermal magnetization curves using Maxwell relation. The samples exhibit large -$\Delta S_M$ associated with their paramagnetic to ferromagnetic transition. Relative to the bulk sample, $\delta$T increases significantly in the nanocrystalline form giving rise to more than 63% enhancement in RC. The calculated values of -$\Delta S_M$(RC) for bulk and nanocrystalline samples are $\sim$2.6J/KgK(173J/Kg) and 2.4J/KgK(282 J/Kg) respectively for magnetic field change of 50 kOe. From present study, it can be inferred that reduction of particle size to the nanoscale may be an effective way to increase $\delta$T and hence improve RC of a material.

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