

Systematic studies of the magnetocaloric properties for the $\text{La}_{0.65}(\text{BaCa})_{0.25}\text{X}_{0.1}\text{MnO}_3$ series (X = alkali metal and alkaline earth metals)

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We present results of systematic studies of magnetocaloric effect (MCE) in a series of manganites $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ with Ca substituted by alkali metal (X = Li, Na, K, Rb, Cs) and alkaline earth metals (Mg, Ca, Sr, Ba). We found that the $\text{La}_{0.65}\text{Ca}_{0.35}\text{MnO}_3$ compound was the best starting composition for further fine-tuning the MCE properties by substitution for Ca with X. For each of the $\text{La}_{0.65}\text{Ca}_{0.25}\text{X}_{0.1}\text{MnO}_3$ samples an extensive characterization of the physical properties was carried out, including: structural analysis, magnetic susceptibility and magnetization vs applied magnetic field measurements, magnetic phase transition identification by Arrott plots, and finally determination of the isothermal magnetic entropy change $-\Delta S_M$. The obtained results indicate a path for searching a compromise composition, i.e. a material exhibiting a reasonable MCE performance at temperatures close to room temperature.