

Thermal hysteresis of magnetocaloric materials: methods for their characterization.

V. Franco¹, J. Y. Law¹, A. Conde¹

¹Dpto. Física de la Materia Condensada, ICMSE-CSIC, Universidad de Sevilla, Apdo. 1065. 41080-Sevilla, Spain

Magnetocaloric materials with a first order phase transition (FOPT) exhibit a much larger response than second order phase transition (SOPT) materials, but at the expense of thermal hysteresis, which is detrimental for potential technological applications.

In this talk we will show that first order reversal curves (FORC) can be used to characterize their temperature and field hysteresis of magnetocaloric materials using a unified description that is much more efficient in terms of time and resources than simply sweeping temperature [1,2]. We will also demonstrate that the composition separating FOPT and SOPT of a series of alloys can be quantitatively determined by taking into account the field dependence of the magnetic entropy change [3]. These results will be illustrated with examples of different families of first order phase transition alloys and compounds.

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