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Magnetocaloric properties of NiMnIn magnetic shape memory alloy

Merivan Sasmaz
Adiyaman University, Turkey

Abstract

Magnetocaloric effect (MCE) is the thermal response of a defined material to shift in an externally applied magnetic field. The magnetic cooling technology is based on the MCE. Recent studies have demonstrated the large MCE existence in NiMnGa, GdSiGe, MnFePAs alloys. In these alloys, the applied magnetic field causes the alignment of magnetic moments which is the reason for large MCE. Since the total entropy of magnetic contribution is reduced with this alignment, electronic and lattice contributions of total entropy are increased which leads to heating of the materials (positive MCE). Nevertheless, in some materials, the applied magnetic field can entail to spin disorder, playing role an increase in magnetic contribution, and a decrease in the rest contributions of total entropy. These materials have the first-order magnetic transition from antiferromagnetic (AF) to ferromagnetic (F) state. Reported experiments have shown that Ni-Mn based Heusler alloys have large positive and negative MCEs and made them strong candidates as refrigerants in magnetic cooling technology. In present work, we experimentally investigated the inverse MCE (negative) of NiMnIn magnetic shape memory alloy and martensitic and magnetic transformations around room temperature.

Biography

Merivan Sasmaz has completed her PhD in 2015 from Firat University about graphene doped nanocomposites. She has completed her Post-Doc to investigate 'Co doped NiMn based Heuslers: Shell ferromagnetism and Magnetocaloric Effects' from Duisburg Essen University. Currently, she is the head of the Electricity and Energy department in Adiyaman University. She has over 40 publications, conference presentations and invited speaker talks, and her publication H-index is 5 and has been serving as an editorial board member of reputed journals and conferences.

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