

Manganese perovskites for room temperature magnetic refrigeration applications

Phan M.-H., Peng H.-X., Yu S.-C., Tho N.D., Nhat H.N., Chau N.

Department of Aerospace Engineering, University of Bristol, Queen's Building, University Walk, Bristol, BS8 1TR, United Kingdom; Department of Physics, Chungbuk National University, Cheongju, 361-763, South Korea; Center for Materials Science, National University of Hanoi, 334 Nguyen Trai, Hanoi, Viet Nam

Abstract: We found the large magnetocaloric effect (MCE) in $\text{La}_{0.6}\text{Ca}_{0.3}\text{Pb}_{0.1}\text{MnO}_3$ (sample No. 1), $\text{La}_{0.7}\text{Ca}_{0.2}\text{Pb}_{0.1}\text{MnO}_3$ (sample No. 2), and $\text{La}_{0.7}\text{Ca}_{0.1}\text{Pb}_{0.2}\text{MnO}_3$ (sample No. 3) perovskites, which were prepared by a conventional ceramic method. For a magnetic field change of 13.5 kOe, the magnetic entropy change (ΔS_M) reached values of 2.55, 2.53 and 3.72 J/kg K for samples Nos. 1, 2 and 3, respectively. Interestingly, the large ΔS_M was found to occur around 300 K for all samples investigated, which allows magnetic refrigeration at room temperature. These perovskites have the large magnetic entropy changes induced by low magnetic field change, which is beneficial for the household application of active magnetic refrigerant (AMR) materials. © 2007 Elsevier B.V. All rights reserved.

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Correspondence Address: Phan, M.-H.; Department of Aerospace Engineering, University of Bristol, Queen's Building, University Walk, Bristol, BS8 1TR, United Kingdom; email: M.H.Phan@bristol.ac.uk
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Authors with affiliations:

1. Phan, M.-H., Department of Aerospace Engineering, University of Bristol, Queen's Building, University Walk, Bristol, BS8 1TR, United Kingdom

2. Peng, H.-X., Department of Aerospace Engineering, University of Bristol, Queen's Building, University Walk, Bristol, BS8 1TR, United Kingdom
3. Yu, S.-C., Department of Physics, Chungbuk National University, Cheongju, 361-763, South Korea
4. Tho, N.D., Center for Materials Science, National University of Hanoi, 334 Nguyen Trai, Hanoi, Viet Nam
5. Nhat, H.N., Center for Materials Science, National University of Hanoi, 334 Nguyen Trai, Hanoi, Viet Nam
6. Chau, N., Center for Materials Science, National University of Hanoi, 334 Nguyen Trai, Hanoi, Viet Nam

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