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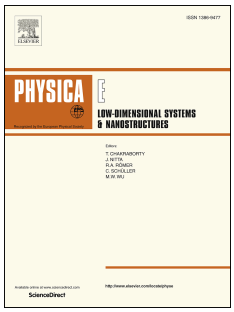

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Y. Benhouria, N. Khossossi, M. Houmad, I. Essaoudi, A. Ainane, R. Ahuja

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Dynamic magneto-caloric effect of a multilayer nanographene: Dynamic Quantum Monte Carlo

Y. Benhouria[1,*], N. Khossossi[1], M. Houmad[5], I. Essaoudi[1,4], A. Ainane[1,2,3,4] and R. Ahuja[4]

[1]*Laboratoire de Physique des Matériaux et Modélisations des Systèmes, (LP2MS) UnitéAssociée au CNRST-URAC 08, University of Moulay Ismail, Faculty of Sciences, Physics Department, B.P. 11201, Meknes, Morocco.*
[2]*Max-Planck-Institut fürPhysik Complexer Systeme, Nöthnitzer Str. 38 D-01187 Dresden, Germany.*
[3]*Laboratoire de Physique des Milieux Denses (LPMD) Institut de Chimie, Physique et Matériaux (ICPM), 1 Bd. Arago, 57070, Metz, France.*
[4]*Condensed Matter Theory Group, Department of Physics and Astronomy, Uppsala University, 75120 Uppsala, Sweden.*
and
[5]*Laboratory of Condensed Matter and Interdisciplinary Sciences (LaMCScI), Faculty of Sciences, Mohammed-V University, Av. Ibn Batouta, B. P. 1014, Rabat, Morocco.*

**) Corresponding author: Y. Benhouria, younes.benhouria@edu.umi.ac.ma, ybenhouria@gmail.com*

Abstract

Using the dynamic quantum Monte Carlo simulation, the dynamic magnetocaloric effect of a ferromagnetic multilayer nanographene (MNG) is studied within the dynamic Ising model under the applied of a time-dependent oscillating ($h(t)$) magnetic field. The influence of the amplitude h_0 and the period τ of the $h(t)$ and the transverse field Ω on the thermal behavior of the dynamic order parameter and the dynamic magnetocaloric properties (the dynamic isothermal $\Delta S_T(T, h(t))$ entropy change and the dynamic $\Delta T_{ad}(t)$ adiabatic change of temperature), the dynamic specific heat, the dynamic entropy andas well as the dynamic relative cooling power (RCP(t)) ferrimagnetic MNG are studied. Our predicted results may be a reference for future experiment and theoretical studies of the nanostructures.

Keywords: Quantum Monte Carlo; Multilayer nanographene; Magnetocaloric effect.

1. Introduction

In the recent years, the magnetocaloric effect (MCE) is an intrinsic and exciting property of magnetic systems, in which, MCE is defined as the warming of magnetic systems when they are subjectedto a magnetic field change and cooling when the field is removed [1]. The MCE has gained an impressive importance both technologically and scientifically because of the