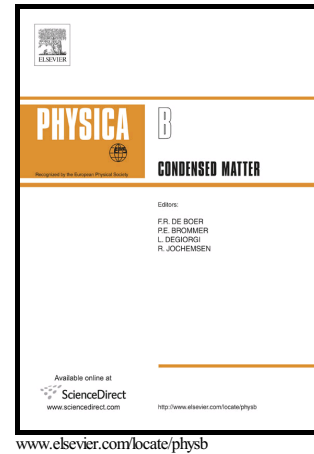


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Hysteresis loop behaviors of a decorated double-walled cubic nanotube

by

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Abstract

The effect of surface shell parameters on the hysteresis loop behaviors of a decorated Ising cubic nanotube, consisting of a ferromagnetic spin- $\frac{1}{2}$ core which is interacting ferrimagnetically with a ferromagnetic spin-1 surface shell, is investigated, in the present work, within the effective-field theory with correlations based on the probability distribution technique. We have found that these parameters have a strong effect on the shape and the number of hysteresis loops and also on the coercive field and remanent magnetization behaviors. Indeed, triple, quintuple, septuple and nonuple hysteresis loop patterns have also been observed.

PACS: 75.-c, 75.40.Mg, 75.45.+j.

Keywords: Decorated Ising cubic nanotube; Ferromagnetic spin- $\frac{1}{2}$ core; Ferromagnetic spin-1 surface shell; Hysteresis loops; Coercive field; Remanent magnetization.

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1 Introduction

Since the discovery of carbon nanotubes (NTs), tubular structures have been widely investigated because of their additional advantage of possessing an empty inner core,

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