Synthesis, Magnetic Properties, Magnetic Entropy and Arrot Plot of Antiferromagnetic Frustrated Er2Ti2O7 Compound

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JOURNAL OF SUPERCONDUCTIVITY AND NOVEL MAGNETISM
Volume: 25 **Issue:** 4 **Pages:** 1035-1042
DOI: 10.1007/s10948-011-1344-9
Published: MAY 2012
View Journal Impact

Abstract

The pyrochlore was synthesized via a ceramic method using two different oxides (Er2O3 and TiO2). The compound was found to crystallize in the cubic system with the space group (No. 227). A magnetic study, carried out at 2 and 300 K under an applied magnetic field mu (0) H=0.05 T, has revealed a complex magnetic structure at low temperature. The effective paramagnetic moment , deduced from (chi-chi (0))(-1)=f(T) curve, was found by assuming a zero moment on the transition metal atom Ti4+. The paramagnetic Curie-Weiss temperature theta (CW)=-21.54 K, the nearest neighbor interaction J (nn) =-2.30 K, the classical nearest neighbor J (cl)=-8.65 K and the dipolar D (nn) =3.76 K interactions' values have revealed an antiferromagnetic behavior for Er2Ti2O7 compound at low temperature. We have also studied the effects of the magnetic field splitting of rare-earth atom Er3+ in the compound Er2Ti2O7 curved Arrott plots.

Keywords

Author Keywords: Pyrochlores oxides; Magnetic frustration properties; Antiferromagnetism; Magnetic entropy change; Second-order magnetic transition; Arrott plot

KeyWords Plus: SPIN-GLASSES; PYROCHLORES; ORDER; TEMPERATURE; DISORDER; LATTICE

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Funding

Funding Agency	Grant Number
Tunisian National Ministry of Higher Education, Scientific Research	
Portuguese Ministry of Higher Education and Scientific Research (Portuguese Agency for Science and Technology, FCT)	
French Ministry of Higher Education and Scientific Research	

View funding text

Publisher

SPRINGER, 233 SPRING ST, NEW YORK, NY 10013 USA

Categories / Classification

Research Areas: Physics

Web of Science Categories: Physics, Applied; Physics, Condensed Matter

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000305222200043

ISSN: 1557-1939

Journal Information

Table of Contents: Current Contents Connect

Impact Factor: Journal Citation Reports

Other Information

IDS Number: 958FP

Cited References in Web of Science Core Collection: 49

Times Cited in Web of Science Core Collection: 3