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## Study of the physical properties of La<sub>2-x</sub>Er<sub>x</sub>Ti<sub>2</sub>O<sub>7</sub> (0 ≤ x ≤ 0.075) compounds

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### EUROPEAN PHYSICAL JOURNAL-APPLIED PHYSICS

Volume: 59 Issue: 1

Article Number: 10601

DOI: 10.1051/epjap/2012120142

Published: JUL 2012

[View Journal Impact](#)

### Abstract

New complex magnetic frustrated materials La<sub>2-x</sub>Er<sub>x</sub>Ti<sub>2</sub>O<sub>7</sub> (0 ≤ x ≤ 0.075) have been synthesized by solid-solid method. The crystallographic and magnetic properties were studied as a function of substitution of the La<sup>3+</sup> ion by the Er<sup>3+</sup> one. All samples are found to be single phase and crystallize in the monoclinic structure with P-21 space group. Magnetic measurements have revealed the presence of dominant antiferromagnetic interactions and the absence of magnetic ordering until a temperature of 2 K. The magnetic study suggests that the Curie-Weiss temperature (theta(CW)) is negative, as expected in the frustrated lanthanide sublattice in the Ln(2-x)Ln<sub>2</sub>M<sub>2</sub>O<sub>7</sub> structure. From the frustration index integral = theta CW/T-N, we have deduced the presence of a strong frustration phenomenon. The critical properties of the antiferromagnetic behavior, for x = 0.025, 0.05 and 0.075 samples, have been investigated. It was found that the 2D-self-avoiding walk (SAW) model is the best one to describe the critical phenomena.

### Keywords

**KeyWords Plus:** SPIN-GLASSES; FRUSTRATED MAGNETS; ANTIFERROMAGNETS; PYROCHLORES; STATE; HEAT

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### Funding

Funding Agency	Grant Number
Tunisian Ministry of Higher Education and Scientific Research	
Portuguese Ministry of Higher Education and Scientific Research (Portuguese Agency for Science and Technology FCT)	20/TP/09
French Ministry of Higher Education and Scientific Research	CMCU 10G1117

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**Categories / Classification**

**Research Areas:** Physics

**Web of Science Categories:** Physics, Applied

**Document Information**

**Document Type:** Article

**Language:** English

**Accession Number:** WOS:000308745600013

**ISSN:** 1286-0042

**Journal Information**

**Table of Contents:** [Current Contents Connect](#)

**Impact Factor:** [Journal Citation Reports](#)

**Other Information**

**IDS Number:** 005JB

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