### Accepted Manuscript

Effect of sintering temperature on structural, magnetic, magnetocaloric and critical behaviors of Ni-Cd-Zn ferrites prepared using sol-gel method

Sobhi Hcini, Noura Kouki, Aref Omri, Abdessalem Dhahri, Mohamed Lamjed Bouazizi

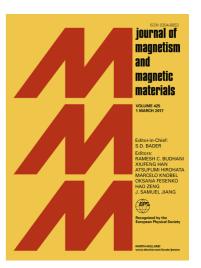
PII: S0304-8853(18)30014-3

DOI: https://doi.org/10.1016/j.jmmm.2018.05.045

Reference: MAGMA 63957

To appear in: Journal of Magnetism and Magnetic Materials

Received Date: 2 January 2018 Revised Date: 13 April 2018 Accepted Date: 16 May 2018



Please cite this article as: S. Hcini, N. Kouki, A. Omri, A. Dhahri, M.L. Bouazizi, Effect of sintering temperature on structural, magnetic, magnetocaloric and critical behaviors of Ni-Cd-Zn ferrites prepared using sol-gel method, *Journal of Magnetism and Magnetic Materials* (2018), doi: https://doi.org/10.1016/j.jmmm.2018.05.045

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## **ACCEPTED MANUSCRIPT**

# Effect of sintering temperature on structural, magnetic, magnetocaloric and critical behaviors of Ni-Cd-Zn ferrites prepared using sol-gel method Sobhi Hcini <sup>1, 2, \*</sup>, Noura Kouki <sup>3, 4</sup>, Aref Omri <sup>1</sup>, Abdessalem Dhahri <sup>5</sup>, Mohamed Lamjed Bouazizi <sup>6</sup>

#### **Abstract**

We have investigated the effect of sintering temperature on structural, magnetic, magnetocaloric and critical behaviors of Ni<sub>0.4</sub>Cd<sub>0.3</sub>Zn<sub>0.3</sub>Fe<sub>2</sub>O<sub>4</sub> ferrites synthesized using solgel method at 900 °C and 1100 °C. X-ray diffraction patterns indicated that samples crystallize in the cubic spinel structure ( $Fd\overline{3}m$  space group) with an increase of lattice constant and average crystallite size as the sintering temperature increases. Magnetic measurements revealed that that the prepared samples undergo second-order ferromagnetic (FM) to paramagnetic (PM) phase transitions. An increment in magnetization, Curie temperature, magnetic entropy change and relative cooling power has been observed with increasing the sintering temperature. The magnetic entropy change reached maximum values of about 1.11 J.Kg<sup>-1</sup>.K<sup>-1</sup> and 1.62 J.Kg<sup>-1</sup>.K<sup>-1</sup> for  $\mu_0 H$ = 5 T corresponding to relative cooling power (RCP) of 152.09 J.Kg<sup>-1</sup> and 253.65 J.Kg<sup>-1</sup> for samples sintered at 900 °C and 1100 °C, respectively. These values are comparable favorably with those of some others ferrites considered as possible candidates for magnetic refrigeration. The estimated critical exponents

<sup>&</sup>lt;sup>1</sup> Research unit of valorization and optimization of exploitation of resources, Faculty of Science and Technology of Sidi Bouzid, University Campus Agricultural City, University of Kairouan, 9100 Sidi Bouzid, Tunisia.

<sup>&</sup>lt;sup>2</sup> Buraydah of Technical College at Al-Asyah, Al-Asyah - King Abdulaziz Road, PB: 304, Al-Asyah 51971, Kingdom of Saudi Arabia.

<sup>&</sup>lt;sup>3</sup> Laboratory of Water, Membranes and Environment Biotechnology (EMBE), Technopole of Borj cedria (CERTE), 2050 Hammam Lif, Tunisia.

<sup>&</sup>lt;sup>4</sup> Qassim University, College of Science, Department of Chemistry, Buraydah Almolaydah, Buraydah, Saudi Arabia.

<sup>&</sup>lt;sup>5</sup> Laboratory of Physical Chemistry of Materials, Department of Physics, Faculty of Sciences of Monastir, University of Monastir, 5019, Tunisia.

<sup>&</sup>lt;sup>6</sup> College of Engineering-Prince Sattam Bin Abdulaziz University, 655, Al Kharj 11942, Kingdom of Saudi Arabia.

<sup>\*</sup> Corresponding authors: E-mail address: <a href="https://hassini271185@gmail.com">hassini271185@gmail.com</a> (S. Hcini)

#### Download English Version:

# https://daneshyari.com/en/article/8152627

Download Persian Version:

https://daneshyari.com/article/8152627

<u>Daneshyari.com</u>