

## Accepted Manuscript

Multiphase  $\text{Ho}_{36}\text{Co}_{48}\text{Al}_{16}$  alloy featuring table-like magnetocaloric effect

E. Agurgo Balfour, Y.F. Shang, Q. Zheng, Y.T. Cao, H. Fu, Ahmed A. El-Gendy, R.L. Hadimani

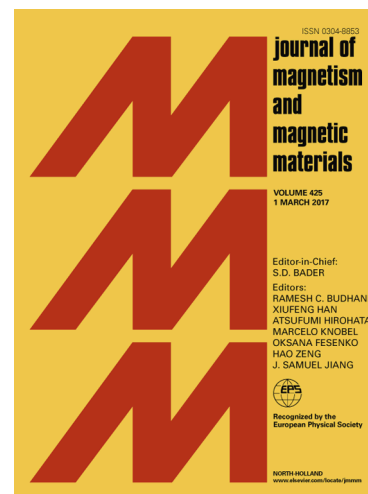
PII: S0304-8853(17)33859-3  
DOI: <https://doi.org/10.1016/j.jmmm.2018.04.037>  
Reference: MAGMA 63883

To appear in: *Journal of Magnetism and Magnetic Materials*

Received Date: 13 December 2017  
Revised Date: 27 February 2018  
Accepted Date: 16 April 2018

Please cite this article as: E.A. Balfour, Y.F. Shang, Q. Zheng, Y.T. Cao, H. Fu, A.A. El-Gendy, R.L. Hadimani, Multiphase  $\text{Ho}_{36}\text{Co}_{48}\text{Al}_{16}$  alloy featuring table-like magnetocaloric effect, *Journal of Magnetism and Magnetic Materials* (2018), doi: <https://doi.org/10.1016/j.jmmm.2018.04.037>

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.



# Multiphase $\text{Ho}_{36}\text{Co}_{48}\text{Al}_{16}$ alloy featuring table-like magnetocaloric effect

E. Agurgo Balfour<sup>a</sup>, Y. F. Shang<sup>a</sup>, Q. Zheng<sup>a</sup>, Y. T. Cao<sup>a</sup>, H. Fu<sup>a\*</sup>, Ahmed A. El-Gendy<sup>b</sup>, R. L. Hadimani<sup>c</sup>

<sup>a</sup>*School of Physics, University of Electronic Science and Technology of China, Chengdu*

*610054, People's Republic of China*

<sup>b</sup>*Department of Physics, University of Texas at El Paso, El Paso, TX 79968, USA*

<sup>c</sup>*Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University,  
Richmond VA 23284, USA*

## Abstract

Table-like magnetocaloric effect is an important requirement for obtaining high efficiency performance in magnetic refrigeration that uses Ericsson cycle. Magnetic and magnetocaloric properties of  $\text{Ho}_{36}\text{Co}_{48}\text{Al}_{16}$  alloy, carefully selected from multiphase region of the ternary Ho-Co-Al system, have been studied. The multiphase alloy exhibits three magnetic phase transitions spread over a wide temperature range. Suitable distribution of phase proportions and respective magnetic entropy changes result in the broadening of the overall peak magnetic entropy change of the alloy. Table-like magnetocaloric effect is obtained with magnetic entropy change of 8.5 J/kg K and large refrigerant capacity of 525 J/kg under applied magnetic field change of 0 to 5 T. At field change of 0 to 2 T, the magnitude of the magnetic entropy change plateau is 2.9 J/kg K with refrigerant capacity of 180 J/kg. The table-like feature and the competitive refrigerant capacity and applied magnetic field change values make the multiphase alloy a practical magnetic refrigerant for efficient low temperature cooling applications that employ the Ericsson cycle, even under permanent magnets.

---

\* Author to whom correspondence should be addressed: [fuhao@uestc.edu.cn](mailto:fuhao@uestc.edu.cn)

Download English Version:

<https://daneshyari.com/en/article/8152474>

Download Persian Version:

<https://daneshyari.com/article/8152474>

[Daneshyari.com](https://daneshyari.com)