

Accepted Manuscript

Synthesis and properties of barium ferrite nano-powders by chemical co-precipitation method

S.L. Hu, J. Liu, H.Y. Yu, Z.W. Liu

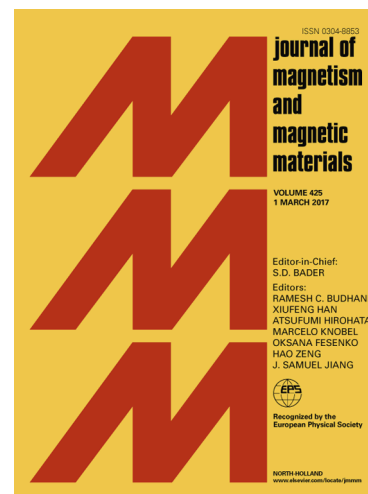
PII: S0304-8853(18)31694-9
DOI: <https://doi.org/10.1016/j.jmmm.2018.10.044>
Reference: MAGMA 64455

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

Received Date: 3 June 2018
Revised Date: 22 August 2018
Accepted Date: 9 October 2018

Please cite this article as: S.L. Hu, J. Liu, H.Y. Yu, Z.W. Liu, Synthesis and properties of barium ferrite nano-powders by chemical co-precipitation method, *Journal of Magnetism and Magnetic Materials* (2018), doi: <https://doi.org/10.1016/j.jmmm.2018.10.044>

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.



Synthesis and properties of barium ferrite nano-powders by chemical co-precipitation method

S.L. Hu¹, J. Liu², H.Y. Yu³, Z.W. Liu^{3,*}

1、School of Automotive Studies, Jiangxi College Of Applied Technology, Ganzhou 341000, China

2、School of Mechanical Engineering, Jiangxi College Of Applied Technology, Ganzhou 341000, China

3、School of Material Science and Engineering, South China University of Technology, Guangzhou 510640, China

Abstract: Nano-powders with controllable particle size, excellent magnetic properties and thermal stability of barium hexaferrite ($\text{BaFe}_{12}\text{O}_{19}$) have been synthesized via a co-precipitation/calcination technique. The phase composition, morphology and magnetic/thermal properties of the products were systematically studied. XRD patterns reveal that a long co-precipitation reaction time (5 h) and high calcination temperature (1100°C) are beneficial for the formation of $\text{BaFe}_{12}\text{O}_{19}$ phase and decreasing the tendency to agglomeration. SEM micrographs show that the products show a hexagonal flake-like particle shape and the size are well controlled and maintained at single-domain particle size range area ($<460\text{nm}$), above which the coercivity will decrease abruptly for the coupling exchange among particles. The products with JH_c of 5934 Oe, temperature coefficient of remanence (α_{Br}) of $-0.176\% \text{ K}^{-1}$ and temperature coefficient of coercivity (β_{JHc}) of $0.0427\% \text{ K}^{-1}$ were obtained when co-precipitated for 5 h and calcined at 900°C for 2h. A high saturation magnetization of 66.9 emu/g was obtained when co-precipitated for 5 h and calcined at 1100°C for 2 h, approaching the theoretical saturation magnetization (72 emu/g).

Key words: Nano-powders; Barium hexaferrite; Co-precipitation; Calcination; Single-domain particle

1. Introduction

Barium hexaferrite, $\text{BaFe}_{12}\text{O}_{19}$, is a well-known permanent magnet with great technical importance and it has attracted an extensive attention for the last few decades. $\text{BaFe}_{12}\text{O}_{19}$ compound has a hexagonal structure with fairly large crystal anisotropy along c-axis. As a result, Ba ferrite has shown high intrinsic

* Corresponding author, Tel: 020-22236906, E-mail: zwliu@scut.edu.cn

Download English Version:

<https://daneshyari.com/en/article/12017286>

Download Persian Version:

<https://daneshyari.com/article/12017286>

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