

# Accepted Manuscript

Synthesis and magnetic properties of cobalt ferrite nanoparticles in polycarbosilane ceramic matrix

Gleb Yu. Yurkov, Konstantin A. Shashkeev, Stanislav V. Kondrashov, Oleg. V. Popkov, Galina I. Shcherbakova, Dmitrii V. Zhigalov, Denis A. Pankratov, Evgeny A. Ovchenkov, Yury A. Koksharov

PII: S0925-8388(16)31736-4

DOI: [10.1016/j.jallcom.2016.06.025](https://doi.org/10.1016/j.jallcom.2016.06.025)

Reference: JALCOM 37894

To appear in: *Journal of Alloys and Compounds*

Received Date: 31 October 2015

Revised Date: 31 May 2016

Accepted Date: 6 June 2016

Please cite this article as: G.Y. Yurkov, K.A. Shashkeev, S.V. Kondrashov, O.V. Popkov, G.I. Shcherbakova, D.V. Zhigalov, D.A. Pankratov, E.A. Ovchenkov, Y.A. Koksharov, Synthesis and magnetic properties of cobalt ferrite nanoparticles in polycarbosilane ceramic matrix, *Journal of Alloys and Compounds* (2016), doi: 10.1016/j.jallcom.2016.06.025.

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.



## of cobalt ferrite nanoparticles in polycarbosilane ceramic matrix

Gleb Yu. Yurkov<sup>1</sup>, Konstantin A. Shashkeev<sup>2\*</sup>, Stanislav V. Kondrashov<sup>2</sup>, Oleg. V. Popkov<sup>2</sup>, Galina I. Shcherbakova<sup>3</sup>, Dmitrii V. Zhigalov<sup>3</sup>, Denis A. Pankratov<sup>4</sup>, Evgeny A. Ovchenkov<sup>5</sup>, Yury A. Koksharov<sup>5,6</sup>

<sup>1</sup> Baikov Institute of Metallurgy and Material Science of the RAS, 119334 Moscow, Russia.

<sup>2</sup> All-Russian Scientific Research Institute of Aviation Materials, 1005005 Moscow, Russia.

<sup>3</sup> State Research Institute for Chemistry and Technology of Organoelement Compounds, 111123 Moscow, Russia.

<sup>4</sup> Faculty of Chemistry M.V. Lomonosov Moscow State University, 119234 Moscow, Russia.

<sup>5</sup> Faculty of Physics M.V. Lomonosov Moscow State University, 119234 Moscow, Russia.

<sup>6</sup> Kurnakov Institute of General and Inorganic Chemistry of the RAS, 119071 Moscow, Russia.

\* Corresponding author at: All-Russian Scientific Research Institute of Aviation Materials, 17 Radio Street, 1005005 Moscow, Russia. Tel.: +7 499 261 86 77; fax: +7 499 267 86 09. E-mail address: shashkon@yandex.ru (K. Shashkeev).

### Abstract

Composite materials comprised of a ceramic matrix with metal-containing nanoparticles were prepared by sintering a blend of cobalt ferrite nanoparticles and polycarbosilane. Sintering process was performed either in air or argon, resulting in different material composition. The air-sintering materials consist mainly of oxide phases (silica matrix and cobalt ferrite nanoparticles). The process of sintering in argon leads to partial reduction of oxides and formation of  $\alpha$ -Fe, carbide and silicate phases. The prepared samples were characterized by the SEM, TEM, XRD and EMR techniques and the Mössbauer spectroscopy. Static magnetic properties were also studied. All samples were found to be soft magnetic. Sintering, especially in argon, increases remnant magnetization of resulting composite products.

**Keywords:** ceramics, nanostructured materials, sintering, magnetisation, Mössbauer spectroscopy.

### 1. Introduction

Magnetic nanoparticles based on ferrite spinels,  $\text{CoFe}_2\text{O}_4$  composition in particular, have drawn attention due to their interesting physical properties and their prospective application in

Download English Version:

<https://daneshyari.com/en/article/7996477>

Download Persian Version:

<https://daneshyari.com/article/7996477>

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