

# Mössbauer Spectroscopy in Materials Science – 2014

# Hlohovec u Břeclavi, Czech Republic

26-30 May 2014

### **Editors**

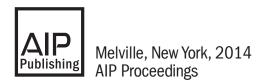
#### Jiří Tuček

 $Regional\ Centre\ of\ Advanced\ Technologies\ and\ Materials,\ Olomouc,\ Czech\ Republic$ 

## **Marcel Miglierini**

Slovak University of Technology, Bratislava, Slovakia

All papers have been peer reviewed.



Volume 1622

#### **Editors**

#### Jiří Tuček

Regional Centre of Advanced Technologies and Materials Department of Experimental Physics Faculty of Science Palacky University 17. listopadu 1192/12 771 46 Olomouc Czech Republic

E-mail: jiri.tucek@upol.cz

#### **Marcel Miglierini**

Institute of Nuclear and Physical Engineering Slovak University of Technology Ilkovicova 3 812 19 Bratislava Slovakia

E-mail: marcel.miglierini@stuba.sk

Authorization to photocopy items for internal or personal use, beyond the free copying permitted under the 1978 U.S. Copyright Law (see statement below), is granted by the AIP Publishing LLC for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$30.00 per copy is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA: http://www.copyright.com. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Services is: 978-0-7354-1259-0/14/\$30.00



© 2014 AIP Publishing LLC

No claim is made to original U.S. Government works.

Permission is granted to quote from the AIP Conference Proceedings with the customary acknowledgment of the source. Republication of an article or portions thereof (e.g., extensive excerpts, figures, tables, etc.) in original form or in translation, as well as other types of reuse (e.g., in course packs) require formal permission from AIP Publishing and may be subject to fees. As a courtesy, the author of the original proceedings article should be informed of any request for republication/reuse. Permission may be obtained online using RightsLink. Locate the article online at http://proceedings.aip.org, then simply click on the RightsLink icon/"Permissions/Reprints" link found in the article abstract. You may also address requests to: AIP Publishing Office of Rights and Permissions, Suite 300, 1305 Walt Whitman Road, Melville, NY 11747-4300, USA; Fax: 516-576-2450; Tel.: 516-576-2268; E-mail: rights@aip.org.

# AIP Conference Proceedings, Volume 1622 Mössbauer Spectroscopy in Materials Science - 2014

## **Table of Contents**

Preface: Mössbauer Spectroscopy in Materials Science - 2014 Jiří Tuček and Marcel Miglierini	1
Conference Photo MSMS	2
Mössbauer study of conductive oxide glass Koken Matsuda, Shiro Kubuki, and Tetsuaki Nishida	3
In-field <sup>57</sup> Fe Mössbauer spectroscopy below spin-flop transition in powdered troilite (FeS) mineral Jan Cuda, Tomas Kohout, Jiri Tucek, Jan Filip, Ondrej Malina, Michal Krizek, and Radek Zboril	8
The influence of the iron content on the reductive decomposition of $A_{3-x}Fe_xAl_2Si_3O_{12}$ garnets (A = Mg, Mn; $0.47 \le x \le 2.85$ )  Claudia Aparicio, Jan Filip, Miroslav Mashlan, and Radek Zboril	12
Study of Chelyabinsk LL5 meteorite fragment with a light lithology and its fusion crust using Mössbauer spectroscopy with a high velocity resolution Alevtina A. Maksimova, Michael I. Oshtrakh, Evgeniya V. Petrova, Victor I. Grokhovsky, and Vladimir A. Semionkin	24
Transmission integral analysis of Mössbauer spectra displaying hyperfine parameter distributions with arbitrary profile  Zoltán Klencsár	30
Study of spatial spin-modulated structures by Mössbauer spectroscopy using SpectrRelax Mikhail E. Matsnev and Vyacheslav S. Rusakov	40
Optimized linear motor and digital PID controller setup used in Mössbauer spectrometer Pavel Kohout, Lukáš Kouřil, Jakub Navařík, Petr Novák, and Jiří Pechoušek	50
Setup of the Mössbauer spectrometer based on stand-alone instruments - A case study Lukáš Kouřil, Pavel Kohout, Petr Novák, Jakub Navařík, and Jiří Pechoušek	58

Liquid nitrogen cryostat for the low-temperature Mössbauer spectra measurements Petr Novak, Jiri Pechousek, Ondrej Malina, Jakub Navarik, and Libor Machala	67
The features of structural transformations in lanthanum manganites $La_{1-x}A_xMnO_{3+\delta}$ (A = Ca, Sr, Ba) Vera D. Sedykh	72
The structural-phase state of iron-carbon coatings formed by the ultradispersed particles Irina A. Manakova, Alexey N. Ozernoy, Yuriy Zh. Tuleushev, Mikhail F. Vereshchak, Valeriy N. Volodin, and Yeldar A. Zhakanbayev	81
Thermally-induced solid state transformation of $\beta$ -Fe <sub>2</sub> O <sub>3</sub> nanoparticles in various atmospheres Ondrej Malina, Josef Kaslik, Jiri Tucek, Jan Cuda, Ivo Medrik, and Radek Zboril	89
Magnetic interaction in oxygenated alpha Fe-phthalocyanines Ernő Kuzmann, Jiri Pechousek, Jan Cuda, Houping Yin, Yen Wei, Zoltán Homonnay, Zoltán Klencsár, Attila Horváth, Libor Machala, Shiro Kubuki, Giorgio Zoppellaro, Radek Zboril, and Amar Nath	97
Mössbauer investigations of hyperfine interactions features of <sup>57</sup> Fe nuclei in BiFeO <sub>3</sub> ferrite Alexey Sobolev, Igor Presniakov, Vyacheslav Rusakov, Alexey Belik, Mikhail Matsnev, Dmitry Gorchakov, and Iana Glazkova	104
<sup>57</sup> Fe Mössbauer investigation of multiferroics BiMn <sub>0.96</sub> <sup>57</sup> Fe <sub>0.04</sub> O <sub>3</sub> and BiMn <sub>0.7</sub> Fe <sub>0.3</sub> O <sub>3</sub> Iana S. Glazkova, Alexey A. Belik, Alexey V. Sobolev, and Igor A. Presniakov	109
Probe Mössbauer spectroscopy of mechanical alloying in binary Cr- <sup>57</sup> Fe(1 at%) system Evgeny P. Elsukov, Denis A. Kolodkin, Alexander L. Ul'yanov, and Vitaly E. Porsev	114
Study of nanocomposites based on iron oxides and pectin Nataliya I. Chistyakova, Alexey A. Shapkin, Ruslan R. Sirazhdinov, Tatiana V. Gubaidulina, Tatiana Yu. Kiseleva, Alexander P. Kazakov, and Vyacheslav S. Rusakov	120
Fine structure of Fe-Co-Ga and Fe-Cr-Ga alloys with low Ga content Nadezhda M. Kleinerman, Vadim V. Serikov, Aleksandr V. Vershinin, Nikolai V. Mushnikov, and Liudmila A. Stashkova	126

Mössbauer study of metallic iron and iron oxide nanoparticles having environmental purifying ability  Shiro Kubuki, Yuka Watanabe, Kazuhiko Akiyama, Mira Ristić, Stjepko Krehula, Zoltán Homonnay,	
Ernő Kuzmann, and Tetsuaki Nishida	134
Mössbauer spectroscopy of human liver ferritin and its analogue, Ferrum Lek, in the temperature range of 295-90 K: Comparison within the homogeneous iron core model Irina V. Alenkina, Michael I. Oshtrakh, Zoltán Klencsár, Ernő Kuzmann, and Vladimir A. Semionkin	142
Mössbauer spectroscopy of <i>Basal Ganglia</i> Marcel Miglierini, Adriana Lančok, Martin Kopáni, and Roman Boča	149