

Journal

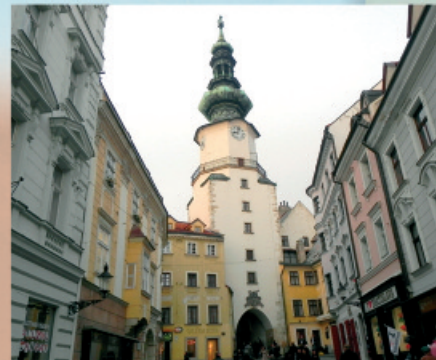
of Achievements in Materials
and Manufacturing Engineering



Published monthly as the organ of the World Academy of Materials and Manufacturing Engineering

Editor-in-Chief Prof. Leszek A. Dobrzański

Volume 49 • Issue 1 • November 2011





Journal

of Achievements in Materials
and Manufacturing Engineering

PUBLISHED SINCE 1992

formerly as **Proceedings on
Achievements in Mechanical
and Materials Engineering**

Published monthly as the organ of the World Academy of Materials and Manufacturing Engineering

Editor-in-Chief

Prof. Leszek A. Dobrzański - Gliwice, Poland

Editorial Council

Deputies Editor-in-Chief

South America

Prof. Maria Helena Robert - Campinas, Brazil

North America

Prof. George Totten - Portland, USA

Europe

Prof. Jose Manuel Torralba - Madrid, Spain

Asia

Prof. Yong Taek Im - Daejeon, South Korea

Australia

Prof. Kanaka Durga Vara Prasad Yarlagadda - Brisbane, Australia

Africa

Prof. Abdalla Wifi - Cairo, Egypt

Associated Editors Team

Production Editor

Ms Marzena Kraszewska, MA

Team Secretary

Dr Małgorzata Dziekońska

Thematic Area Editors

Dr Mirosław Bonek

Dr Klaudiusz Gofombek

Dr Magdalena Polok-Rubiniec

Dr Anna Włodarczyk-Fligier

Dr Bogusław Ziębowicz

Statistical Editor

Dr Daniel Pakuła

Language Editor

Dr Janusz Madejski

Editorial Assistance

Ms Justyna Hajduczek, MSc

Mr Paweł Jarka, MSc

Ms Magdalena Kałużna, MSc

Ms Małgorzata Ondrula, MSc

Reading Direct

Mr Adam Jagiełło, MSc

Mr Piotr Zarychta, MSc

Editorial Key Reviewers Committee

Prof. Sadek Absi Alfaro - Brasilia, Brazil

Prof. Gilmar Batalha - Sao Paulo, Brazil

Prof. Emin Bayraktar - St-Ouen, France

Prof. Andrzej Buchacz - Gliwice, Poland

Prof. Tara Chandra - Wollongong, Australia

Prof. Antonio Cuhna - Guimaraes, Portugal

Prof. Marek Dollar - Oxford, Ohio, USA

Prof. Georgiy Drapak - Khmielnitskiy, Ukraine

Prof. Sabahudin Ekinović - Zenica, Bosnia and Herzegovina

Prof. Renato Esposito - Naples, Italy

Prof. Spilios Fassois - Patras, Greece

Prof. Janez Grum - Ljubljana, Slovenia

Prof. Toshio Haga - Osaka, Japan

Prof. Marek Hetmańczyk - Katowice, Poland

Prof. Abdel Magid Hamouda - Doha, Qatar

Prof. Stuart Hampshire - Limerick, Ireland

Prof. Hong Hocheng - Hsinchu, Taiwan

Prof. Werner Hufenbach - Dresden, Germany

Prof. Mark James Jackson - Worcester, USA

Prof. Jerzy Jędrzejewski - Wrocław, Poland

Prof. Prof. Rudolf Kawalla - Freiberg, Germany

Prof. Andrzej Klimpel - Gliwice, Poland

Prof. Ivars Knets - Riga, Latvia

Prof. Janez Kopac - Ljubljana, Slovenia

Prof. Piotr Kula - Lodz, Poland

Prof. Karl Kuzman - Ljubljana, Slovenia

Prof. Bogusław Major, Cracow, Poland

Prof. Cemal Meran - Denizli, Turkey

Prof. Stanisław Mitura - Łódź, Poland

Prof. Andrew Nee - Singapore, Singapore

Prof. Jerzy Nowacki - Szczecin, Poland

Prof. Abraham Ogwu - Paisley, United Kingdom

Prof. Jerzy Pacyna - Krakow, Poland

Prof. Peter Palcek - Zilina, Slovak Republic

Prof. Fusheng Pan - Chongqing, China

Prof. Zbigniew Rdzawski - Gliwice, Poland

Prof. Mario Rosso - Turin, Italy

Prof. Stanislav Ruz - Ostrava, Czech Republic

Prof. Mirko Sokovic - Ljubljana, Slovenia

Prof. Božo Smoljan - Rijeka, Croatia

Prof. Jerry Sokolowski - Windsor, Ontario, Canada

Prof. Zinovij Stotsko - Lviv, Ukraine

Prof. Yuriy Shalapko - Khmielnitskiy, Ukraine

Prof. Jerzy Świder - Gliwice, Poland

Prof. Ming-Jen Tan - Singapore, Singapore

Prof. Miklos Tisza - Miskolc, Hungary

Prof. Boris Tomov - Rousse, Bulgaria

Prof. Bekir Sam Yilbas - Dhahran, Saudi Arabia

Prof. Gabriel Wróbel - Gliwice, Poland

Prof. Marian Żenkiewicz - Bydgoszcz, Poland



This journal is a part of Reading Direct, the free of charge alerting service which sends tables of contents by e-mail for this journal and in the promotion period also the full texts of papers. You can register to Reading Direct at <http://www.journalamme.org>

Patronage



World Academy of Materials
and Manufacturing Engineering



Polish Academy of Sciences,
Committee of Materials Science,
Section of Metallic Materials



International Federation of Heat Treatment and Surface
Engineering



Association of Computational Materials Science and
Surface Engineering



Institute of Engineering Materials
and Biomaterials of Silesian University
of Technology, Gliwice, Poland

Financial support

In 2011 the publication of the Journal is financially supported by the Ministry of Science and Higher Education in Poland.

Abstracting services

This Journal is sent to individual receivers from ca. 50 countries of the world and is delivered to the National Libraries and Universities and also to other scientific institutions in ca. 50 countries of the world. The electronic system of Reading Direct allows to access to the electronic version of that journal online, in the promotional period free of charge. This Journal is included in the reference list of the Polish Ministry of Science and Higher Education (9 points). The Journal is cited by Abstracting Services such as:



Directory of Open
Access Journals



Google Scholar



Scirus



Ulrich's
Periodical Directory



BazTech



Journalseeker



Libsearch



WorldCat



Dragon
Libraries
Catalogue

The procedure of its registration in the databases of Scopus, Compandex, CiteSeer, GetCited, Web of science, Engineering Village, Public Knowledge Project, Edith Cowan University's Institutional Repository, Journals Online and Inspec has begun.

Journal Registration

The Journal is registered by the Civil Department of the District Court in Gliwice, Poland at number 279.

Publisher

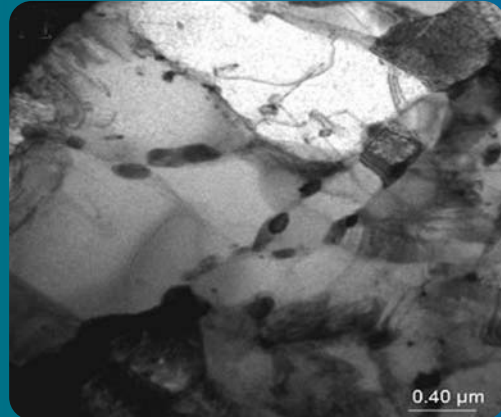


Gliwice 44-100, Poland
ul. S. Konarskiego 18a/366
e-mail: info@journalamme.org

Bank account:
Stowarzyszenie Komputerowej Nauki o Materiałach i Inżynierii Powierzchni
Bank name: ING Bank Śląski
Bank address: ul. Zwycięstwa 28, 44-100 Gliwice, Poland
Account number/ IBAN CODE: PL76105012981000002300809767
Swift code: INGBPLPW

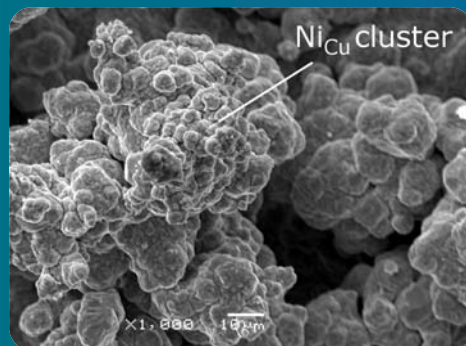
Gliwice – Campinas – Portland – Madrid – Daejeon – Brisbane – Cairo
© 2011 International OCSCO World Press. All rights reserved
The paper used for this Journal meets the requirements of acid-free paper
Printed in Poland

Selected materialographical photo



7

The research paper made by S. Mroziński and G. Golański on "Low cycle fatigue of GX12CrMoVNbN9-1 cast steel at elevated temperature" on a **page 7** shows the low cycle fatigue of high – chromium martensitic GX12CrMoVNbN9 – 1 cast steel from the perspective of the strain and energy criterion. The examined cast steel during low cycle fatigue is a subject to intense weakening. The period of stabilization was not revealed during the cyclic loading of the cast steel, neither at room temperature, nor elevated one. Moreover, it has been proved that the extent of changes in the cyclic properties is influenced by the level of strain and temperature. The paper presents the fatigue characteristics of GX12CrMoVNbN9-1 cast steel within the scope of small amount of cycles to failure. The fatigue characteristics of the examined cast steel was developed for both: room temperature and elevated temperature – 400, 550 and 600oC. Fatigue life of the investigated cast steel was described using the equations of Ramberg-Osgood and Manson-Coffin-Basquin, and presented from the perspective of the energy criterion. Obtained results of the tests are indispensable for the formulation of necessary characteristics of high-temperature creep resisting steels and cast steels.



17

The Properties section represented by A. Chrobak, M. Kubisztal, J. Kubisztal, E. Chrobak and G. Haneczok on "Microstructure, magnetic and elastic properties of Cu+Ni nanocomposites coatings obtained by applying electrodeposition technique" on a **page 17** describes a fabrication process and different properties of Cu+Ni nanocomposite coatings obtained by applying electrodeposition technique. A special attention is paid to establish the influence of sample fabrication conditions and microstructure of the coating material on its magnetic and elastic properties. It was shown that one can obtain magnetic Cu+Ni nanocomposite coatings by applying the electrolytic deposition method based on a standard electrolyte and current densities in the range 1-100 mA/cm². Magnetization versus temperature *M(T)* curves shows a superparamagnetic effect being dependent on dispersion of magnetic particles in a nonmagnetic matrix at T<50 K. This effect is proportional to the field *H_s* required to saturation of magnetization curves. This means that determination of the *H_s* gives information about the dispersion of magnetic particles in a nonmagnetic matrix. It was shown that the observed decrease of the apparent Young's modulus due to an increase of coating roughness factor can be well described by an exponential function drastically different for nano-sized and micro-sized Ni powder. The proposed method of evaluating of dispersion degree of magnetic nano-sized powder in non-magnetic matrix based on magnetic measurements can be applied in many scientific problems in the field of magnetic nanocomposite materials.