

NINTH YOUNG RESEARCHERS CONFERENCE MATERIALS SCIENCES AND ENGINEERING

**December 20-22, 2010, Belgrade, Serbia
Serbian Academy of Sciences and Arts, Knez Mihailova 35**



Program and the Book of Abstracts

**Materials Research Society of Serbia,
Institute of Technical Sciences of the
Serbian Academy of Sciences and Arts**

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Book title:

**Ninth Young Researchers Conference - Materials Sciences and Engineering:
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Publisher:

**Institute of Technical Sciences of the Serbian Academy of Sciences and Arts
Knez Mihailova 35/IV, 11000 Belgrade, Serbia**

Tel: +381-11-2636994, fax: 2185263

<http://www.itn.sanu.ac.rs>

Editor:

Prof. Dr. Nenad Ignjatović

Technical Editor:

Aleksandra Stojičić

Printer:

Copy Planet

Brankova 12, 11000 Belgrade, Serbia

Tel: +381-11-3036545, fax: 3036546

<http://www.copyplanet.rs>

Edition:

130 copies

CIP – Каталогизacija у публикацији
Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers Conference Materials Sciences and Engineering (9 ; 2010 ; Beograd)

Program ; #and the #Book of Abstracts / Ninth Young Researchers Conference Materials Sciences and Engineering, December 20–22, 2010, Belgrade, Serbia ; [organized by] Materials Research Society of Serbia and Institute of Technical Sciences of the Serbian Academy of Sciences and Arts ; [editor Nenad Ignjatović]. – Belgrade : Institute of Technical Sciences of SASA, 2010 (Belgrade : Copy Planet). – XIV, 50 str. ; 30 cm

Tiraž 130. – Registar.

ISBN 978–86–80321–26–4 (ITNSANU)

1. Materials Research Society (Beograd) 2. Institute of Technical Sciences of SASA (Beograd)

a) Наука о материјалима - Апстракти b) Технички материјали – Апстракти

COBISS.SR-ID 180427276

Aim of the Conference

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

Topics

Nanostructured materials
New synthesis and processing methods
Materials for high-technology applications
Biomaterials

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Results of the Conference

Beside printed «Program and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in the journals Tehnika – Novi Materijali and Chemical Industry. The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony.

I/10

Age hardening potential of an Al-4.6 wt.% Mg alloy with Cu addition

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The ageing behavior of an Al-4.6Mg-0.54Cu (in wt.%) alloy was studied after: (i) solution treatment for 1h at 530°C, and (ii) annealing at 280°C for 3h. Both groups of the heat treated specimens underwent further thermo-mechanical processing: 5% pre-deformation in tension + artificial ageing at various temperatures: 140°, 160° and 180°C for 30 min. Effect of the thermo-mechanical processing on the microstructure and mechanical properties was investigated by tensile testing and electrical resistivity measurements.

Solutionizing at 530°C resulted in higher resistivity level indicating that the most of solute atoms are retained in the solid solution. This provides great potential for precipitation hardening in a wide range of ageing temperatures. On the other hand, it appears that most of the main alloying elements precipitated during the annealing at 280°C thus diminishing the ageing potential. After further thermo-mechanical processing, the specimens annealed at 280°C showed significantly lower strength level than once solutionized at 530°C.

Key words: Al-Mg-Cu alloy, ageing, precipitation hardening, mechanical properties.

I/11

Properties of electrochemically deposited Ni_xFe_yW_z alloy powder

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Nanostructural powder Ni_xFe_yW_z was electrochemically deposited from ammoniac citrate bath at room temperature by using different current densities higher than 500 mA/cm². X-ray diffraction analysis has shown that the obtained powder contain crystal phase with the Fm-3m symmetry of FCC solid solution of Ni, Fe and W. Particles in the shape of cauliflower with a large number of pores were observed by TEM. Depending on current densities and chemical composition of bath size of nanocrystals was in the range from 2 nm to 7 nm.

Temperature dependence of the magnetic susceptibility of powder was investigated by the modified Faraday method in the temperature region from room temperature up to 600 °C. It has been established that the Curie temperature of as-prepared powder is about 300 °C. After first heating up to 400 °C magnetic permeability increases for about 12 %. After second heating up to 600 °C magnetic permeability decreases for about 5 %, but Curie temperature increases to about 400 °C.