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ABSTRACT METALURGLIA NR. 1 2010

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MATERIALS SCIENCE RESEARCH AND DEVELOPMENT

MAGNETARC WELDING – PECULIARITIES OF JOINING THIN WALL TUBES

Danut IORDACHESCU, Mihaela
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Jesús RUIZ-HERVIAS

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Key words: MAGNETARC welding,
temperature field, joint microstructure,
hardness.

Abstract: *The paper presents the MAGNETARC welding of thin tubes achieved with an original longitudinal magnetization system, designed to assure the magnetic flux concentration on tube wall. Process main stages are presented, from the arc initiation until the molten metal appears, upsetting is achieved and the weld forms. Infrared thermography was used for temperature measurements and process visualization. Macro and microstructural analysis accompanies the hardness tests made on correspondingly welded samples, demonstrating the process capability of producing sound, qualitative joints.*

DESIGN AND EXPERIMENTATION OF A TITANIUM ALLOY NEW TYPE IMPLANT WITH NANOSTRUCTURED SURFACES

Doina RADUCANU, Anna NOCIVIN,
Augustin Santana LOPEZ, Julia Marza
ROSCA, Donato Monopoli FORLEO,
Enrique Rodriguez GRAU-BASSAS,
David Gonzalez MARTIN, Vasile-Danut
COJOCARU, Ion CINCA

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Key words: titanium, implant,
nanostructures.

Abstract. *The development of implant / tissue-engineering strategies into clinical therapeutic protocols requires extensive, preclinical experimentation in appropriate animal models. The major considerations facing any implant / tissue-engineering testing logic include the choice of the defect, selection of the optimal biomaterial for the implant, capable of high biocompatible properties, selection of the animal, the age of the animal, the anatomic site, the size of the lesion, and most important, the micro-mechanical environment. Regarding these considerations, present paper refers to some researches effectuated in the frame of a scientific project which has in view the obtaining of new metallic biomaterials from a Ti-Al-Nb alloy, with different HA-type coatings, and also the design and realization of new special knee implant together with a selection of a suitable animal model for preclinical experimentation of the implants.*

QUALITY CONTROL PARAMETERS OF THE LASER BEAM HARDENED LAYERS

Ion MITELEA, Ilare BORDEASU,
Marius Eremia VLAICU-POPA, Ion-
Dragoş UȚU

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Key words: non-alloyed steels, laser,
hardened layer.

Abstract: *The paper analyses the influence of carbon content and of some process parameters on the hardened layer*

quality by laser beam hardening. At the same steel carbon content, increasing of the laser head advance speed provokes a decreasing both of the layer depth and hardened zone width. For a constant advance speed of the laser head (2 m/min,) a larger hardened zone width from 1.1 mm to 1.25 mm appears, as the carbon concentration grows from 0.25 to 0.55 %. By a constant laser power and at the same carbon content, the surface microhardness increases with 200-400 HV, as the advance speed grows from 1 m/min to 2 m/min after that remains practically constant. The microhardness measurements demonstrated that by increasing of the laser head advancing speed one reduces the laser-material interaction, and by increasing the power over a certain stage some carbide precipitation phenomena occurred.

OBTAINING, PROCESSING AND CHARACTERIZATION OF AN ELECTRO-CONDUCTIVE COMPOSITE MATERIAL WITH ALUMINUM MATRIX REINFORCED WITH COPPER WIRES

Octavian POTECAȘU, Florentina POTECAȘU

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Key words: composite materials, aluminum matrix, copper, reversed extrusion, electrotechnical industry.

Abstract: *Electrical cables for fixed, mobile installations or electrical energy transport lines, represent a significant part of the materials from the electrotechnical industry. At the moment these cables are made out of copper or aluminum. Copper cables are clearly superior to the aluminum ones, with lower electrical resistivity and more convenient mechanic characteristics. But wherever possible, aluminum is preferred, as it is cheaper, lighter and scantier. Through junction at a macroscopic level of the two metals, the authors have obtained an electroconductive Al-Cu composite material, which can enlarge the aluminum*

usage field in electrotechnics. Al-Cu conductors were obtained, through reversed extrusion, with aluminum matrix reinforced with copper threads, with a percentage up to 20 %. The obtained Al-Cu composite materials have specific mechanic, electric, and structural properties different from those of the component metals and classic Al-Cu alloys. As the researches were made, it resulted that the improving of usage properties for these materials can be realised through convenient choice of the deformation degree, of the quantity and the distribution reinforcement phase in matrix, as well as through applying some later thermal treatments, that can influence favorably the processes which take place in the limit zone between components.

CHARACTERIZATION OF IRON AND LOW ALLOY STEEL POWDERS OBTAIN BY WATER ATOMIZATION

Mihaela MARIN, Rui CORDEIRO SILVA

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Key words: powder metallurgy, iron powder, low alloy steel, water atomization, flow rate, apparent density, particle size distribution.

Abstract: *three types of iron and low ally steel powders were investigated to determinate their physical properties and surface morphology by SEM analysis. the powders were obtain by water atomization. the first type of powder is an iron powder (P₁) and low alloy steel powders. frequently, the alloying elements are copper, nickel and molybdenum (powders P₂ and P₃).*