RUSSIP -Russian and Spanish Innovation Program -
Project partners search form

Contract Person Details	
Name: Miguel Angel Rodiel	
Position: Technology Manager	
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Organization Details:			
Name: IMDEA Materials Institute (**in collaboration with a Russian SME NanoMet Ltd.)**			
Country: Spain	Website: http://www.materiales.imdea.org/		
Type of Organization:	[ ] SME [X] Research Inst.	[ ] Large Company [ ] Administration	[ ] University [ ] Other (specify):
Number of Employees:	[ ] < 10 [ ] 101-250	[ ] 11-50 [ ] > 250	[X] 51-100

Describe the activities, products, services, and expertise of your organization:

About IMDEA Materials:
The main objective of IMDEA Materials is technology transfer to industry to increase competitiveness and maintain technological leadership in the following areas:

- Nanomaterials for Multifunctional Applications
- The Next Generation of Composite Materials
- Alloy Design, Processing and Development
- Integrated Computational Materials Engineering
- Multiscale Characterization of Materials and Processes

About the Russian SME **NanoMet Ltd**.: http://nanospd.ru/eng/nanomet%20ltd.html

The Russian SME NanoMet Ltd. was founded in 2007 as a spin off of Ufa State Aviation Technical University (Ufa, Russia). The company's objective was to organize the first in the world pilot-commercial production of semi-products (rods) from nanostructured titanium for medical applcations. Since 2010, NanoMeT has been commercially producing semi-products (rods) for nanostructured titanium fofr medical applications in compliance with the registered Technical Specifications (TU 1825 – 001 – 02069438 – 2010). These semi-products are intended for making dental implants and are in demand by manufacturers of dental implants.

In 2012 NanoMeT received an international ISO 9001:2008 certificate for its quality management system. The certificate was issued by TÜV SÜD Management Service GmbH (Munich, Germany), certificate registration number 12 100 43097 TMS. In February-March 2015 NanoMeT successfully passed a recertification audit by TÜV SÜD Management Service GmbH. To date, NanoMeT has mastered the production of long-length rods (over 2 m in length) with a diameter of 3 -6 mm. The estimated production capacity is 2.5 tons per year. Currently, NanoMet Ltd. is developing processing routes for manufacturing of high strength conductors (wires and cables) from Cu and Al-based materials

Project Details

Project Title	Spanish: Desarrollo de conductores de materiales de base Al y Cu nanoestructurados de alta resistencia con conductividad eléctrica mejorada English: Development of high strength nanostructured conductors with improved electrical conductivity from Al and Cu based materials
Keywords	Al-based materials, Cu-based materials, deformation processing, nanostructure, high strength, enhanced electrical conductivity

Describe your Project:

Spanish:
El principal objetivo de este Proyecto es **desarrollar un nuevo enfoque de tecnologías de procesado (basado en procesado por Deformación Plástica Severa (SPD)) para la fabricación de materiales de base Cu y/o Al de alta resistencia con conductividad eléctrica mejorada**. Las propiedades mecánicas serán mejoradas mediante la nanoestructuración de los materiales masivos, mientras que el diseño inteligente microestructural en la aleación permitirá retener su alta conductividad eléctrica.
El proyecto incluirá diferentes tareas:

- Desarrollo de rutas de procesado avanzado para diseño inteligente nanoestructural para mejorar las propiedades mecánicas de los materiales de base Cu y/o Al mediante procesado SPD.
- Caracterización mecánica detallada de los nanomateriales fabricados y análisis de su conductividad eléctrica y otras propiedades funcionales importantes para sus aplicaciones comerciales.
- Optimización de las rutas de procesado para su comercialización a escala industrial.

English:
The main objective of this project is **to develop novel approach for processing technologies (based on SPD processing) for fabrication of high strength nanostructured Cu- and/or Al-based materials with improved electrical conductivity.** Mechanical properties will be improved via nanostructuring of materials in bulk, whereas intelligent microstructural design in the alloy will allow to retain its high electrical conductivity.
The **project** will include several tasks:

- Development of advanced processing routes for intelligent nanostructural design to increase mechanical properties of Cu- and/or Al-based materials via advanced SPD processing.
- Detailed mechanical characterization of the manufactured nanomaterials and analysis of their electrical conductivity and other functional properties, which are important for their commercial applications.
- Optimization of the processing routes for their easy commercialization at industrial scale.

Describe the innovative part of your project:

The originality of the project lies on idea of intelligent microstructural design to improve dramatically mechanical properties of the Cu- and/or Al-based alloys without degradation of their electrical conductivity and other functional properties important for their applications. Grain refinement down to ultra-fine or nanoscale allows to improve mechanical strength, whereas purification of matrix from solute atoms via dynamic aging provides improvement of their electrical conductivity compared to their conventional coarse-grained counterparts. Preliminary experimental research activities carried out by academic project partners have proven the viability of this idea. The continuous processing routes (such as equal channel angular pressing Conform) will be utilized for processing of nanostructured Cu- and/or Al-based alloys. These techniques are commercially viable and can be used for manufacturing of wires, cables and rods.

Describe the market expectations of your project:

Cu- and Al-based alloys have been the most widely used in the electrical engineering as materials for conductors. There are current tendencies to replace expensive Cu with high density by a cheaper light-weight Al having a lower conductivity compared to pure Cu. The outcomes of the present project will allow to the producers of wires and cables to obtain a principally new processing technique for manufacturing of advanced high strength Al and/or Cu wires and cables with improved electrical conductivity. Application of such conductors in electrical engineering will greatly minimize energy loss during its transportation.

Possible Partner Profile:

Type of Partner Needed (multiple choices are allowed)	[X] SME	[X] Larger Company
	[ ] University	[ ] Research Institution
	[ ] Administration	[ ] Other (specify):

Describe the expertise of possible partner(s) required for your project:

- Experience in manufacturing of cables and/or wires.

Describe the role of possible partner(s) in your project:
Spanish:

- Proveer información detallada de los requerimientos de conductores eléctricos actuales.
- Análisis de propiedades específicas de conductores relacionadas con sus aplicaciones comerciales (tales como ensayos de cortocircuito, etc.)
- Fabricación de cables y alambres mediante conformado por *equal channel angular pressing Conform*

English:

- To provide detailed information on requirements of modern electrical engineering to electrical conductors.
- Analysis of specific properties of conductors with respect to their commercial applications (such as short circuit test, etc.)
- Manufacturing of high strength nanostructured Al- and/or Cu-based cables and wires using *equal channel angular pressing Conform*.