

Technology Offer

Novel osteoconductive coatings in mono and bilayer structures used in biomedical applications

Summary

A team of Romanian researchers has developed novel materials used for preparing the osteoconductive coatings in mono and bilayer structures. Designed for biomedical applications, the novel materials represent an innovative solution to increase the service life of load bearing implants. The innovative osteoconductive coatings are lab tested. The Romanian team is now looking for SMEs, universities and research centres for further development possibilities based on a research cooperation agreement

Expiration Date 25 November 2019

Reference TORO20181109001

Details

Description

Established in 1992, a Romanian research institute is active in the field of fundamental and applicative research in optoelectronics, analytical chemistry and mechanical engineering. Within the institute, a team of Romanian researchers has developed novel materials used for preparing the osteoconductive coatings in mono and bilayer structures.

The actual challenge in the orthopaedic surgery is to obtain orthopaedic implants with good mechanical, physical, chemical and surface compatibility with the bone. But the difficulties are remarkable, because these characteristics fail in time and, in general, it is difficult for a single material to have all the required properties. Furthermore, the research necessity in this field results from the fact that in Romania the number of revisions is growing fast, especially for young people. Therefore, the main objective of the Romanian research team was to increase the service life of load bearing implants from 10-15 years to 30 years.

In order to answer the above mentioned problem, the Romanian research team proposes novel materials as solution for the improvement of load bearing implants properties, by developing novel implants with superior mechanical, anticorrosive, tribological and biological properties compared to the classical ones, and with high osseointegration and antibacterial capabilities. By adapting the existing technology for obtaining biocompatible thin layers, the Romanian research team obtained in laboratory conditions novel materials designed for the biomedical applications, especially for orthopaedics. The novel osteoconductive coatings, in mono and bilayer structures, were obtained and tested up to the "in vitro" stage (human cell laboratory tests).

Thus, the Romanian research group is interested in a research cooperation agreement that will offer them the possibility to work together with international partners in order to perform the "in vivo" assessment of the developed coatings using the laboratory animals, so as to evaluate their osseointegration abilities close to real conditions. Furthermore, the Romanian research team also aims to establish international co-operations for: •investigation of "in vitro" bio-mineralization abilities of these novel implants; •advanced studies on the porous metallic

structures coated with these thin films; •analysis of antibacterial properties of these novel implants using a complex tests in order to have a clear answer of their toxicities. In order to reach its goals, the Romanian research team is interested in identifying potential partners among SMEs, universities and/or research centres with whom to further develop the novel materials on the above mentioned directions, based on a research cooperation agreement.

Advantages and Innovations

The main advantage of the novel osteoconductive coatings in mono and bilayer structures is the possibility to increase the service life of load-bearing implants. The osteoconductive coatings enhance the osteoconductive capability of the Titanium(Ti) based alloy, by revealing an optimum combination of the coating micro-hardness, adhesion, residual stress, toughness, friction, corrosion-wear resistance, osteoconduction, and biocompatibility.

These osteoconductive coatings are novel solutions - there are no similar coatings on the market.

By adapting the existing technology for obtaining biocompatible coatings, the Romanian researchers have developed novel materials which, at the industrial level, offer a good quality – cost ratio.

Stage of Development

Under development/lab tested

Comments Regarding Stage of Development

The novel osteoconductive coatings in mono and bilayer structures have been obtained in laboratory conditions and tested up to the “in vitro” stage (human cell laboratory tests).

IPR Status

Patent(s) applied for but not yet granted

Comment Regarding IPR status

The application to the Romanian State Office for Inventions and Trademarks is pending.

Network Contact

Issuing Partner

AGENCIA ANDALUZA DEL CONOCIMIENTO

Contact Person

María Fernández Santa Cruz Campos

Email

maria.fernandezsantacruz@juntadeandalucia.es

Open for EOI : **Yes**

Dissemination

Relevant Sector Groups

Healthcare
Materials

Client

Type and Size of Organisation Behind the Profile

R&D Institution

Year Established

1992

Turnover

<1M

Already Engaged in Trans-National Cooperation

Yes

Certification Standards

ISO 9001

Languages Spoken

English

Client Country

Romania

Partner Sought

Type and Role of Partner Sought

The Romanian research team is interested in working together with foreign SMEs (active in the industrial products field, namely coatings), universities and/or research centres on the exploratory research and further development possibilities of the novel osteoconductive coatings in mono and bilayer structures, on the basis of a research cooperation agreement. As the Romanian research team has obtained novel materials by adapting the technology for obtaining biocompatible thin layers, they are now looking for partners interested and able to:

- investigate “in vitro” bio-mineralization abilities of these novel implants;
- perform the “in vivo” assessment of the studied coatings, in order to evaluate their osseointegration abilities;
- develop the porous metallic structures which will be coated with these thin films, being further investigated;
- analyse antibacterial properties of these novel implants.

Type and Size of Partner Sought

SME 11-50, University, R&D Institution, SME 51-250

Ref: TORO20181109001

Type of Partnership Considered

Research cooperation agreement