The 7th edition of the Nanoscience and Nanotechnologies National Seminar,

20th of March 2008,

Romanian Academy, Bucharest, Romania

This seminar is continuing a series of events organised in the frame of FP 6 European project ROMNET-ERA (**http://www.romnet.net/**) even the project ended in 2007. Romanian Academy and IMT-Bucharest the coordinator of the project and organised the 7th edition which was dedicated to promoting the Romanian scientific results, resources and activities in micro- nano and bio technologies domain. Speakers presented in their papers at the oral session the latest results from Romanian scientific community, the newest equipments acquisitioned trough the national or international infrastructure research projects and the educational opportunities for young researchers or students.

Prof. Ion Mihailescu, INFLPR, Bucharest Romania

The Seminar included sessions for oral presentations of scientific papers (18 papers presented), debates and poster sessions (28 posters displayed). The debates offered an opportunity for the people attending the event to consult the speakers and discuss various interpretations of the results and applications presented.

Poster Session

85 participants attended the event, the majority coming from national R&D research institutes but also participants from universities and industry.

The extended version of the papers presented at the 7th seminar edition will be published in "Micro and Nanoengineering" series (edited by the Publishing House of the Romanian Academy).

.This MNT Bulletin edition presents the paper „Nanostructured biomaterial thin films synthesized by pulsed laser technologies: new applications to implantology" by Prof. Ion Mihailescu, INFLPR, Bucharest Romania.

Nanostructured biomaterial thin films synthesized by pulsed laser technologies: new applications to implantology (I)

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Laser-Surface-Plasma Interactions (LSPI) Laboratory (*http://lspi.inflpr.ro*), Lasers Department, National Institute for Lasers, Plasma and Radiation Physics has more than 35 years of experience in the field of laser generated plasmas, laser-surface interactions, and material processing with lasers. *The permanent staff of the Laboratory consists of one university professor, 7 PhDs, 8 PhD students and 5 graduate students.*

Our current researches are focused on: biocompatible and bioactive thin films synthesis and characterization, nanostructured films for gas- and bio-sensing, new thin films for spintronics, laser transfer of delicate complex molecules of polymers and living cells, and the kinetics of interfacial layer growth during pulsed laser deposition of thin films on various substrates.

Recent research activities of LSPI laboratory were focused on obtaining biomimetic coatings for advanced metallic medical implants. They involve new composite thin films and fabrication technologies. We analyze the potential of biocompatible, bioactive thin layers for specific applications in orthopedic and dental surgery and implantology.

To overcome the major drawback of the second correction surgeries caused by the incomplete biocompatibility of the metallic implants, it was developed the solution to cover the metallic implants with biomimetic layers of excellent biocompatibility and high bioactivity. Pulsed Laser Deposition (PLD) proved in this respect a versatile technique to grow

Fig. 1: Pulsed Laser Deposition facility in operation in LSPI Laboratory

thin films, with important significant advantages. PLD presents the unique ability to obtain a large variety of coatings morphology, from amorphous to crystalline, dense to porous or from rough to uniform. The complex stoichiometry of almost any biomaterial is preserved during pulsed laser experiments as demonstrated in our studies after 2000 [1, 2].

One restriction of the method is deriving from the physical mechanisms of the laser ablation: in case of delicate organic or biological molecules, the laser irradiation provokes an irreversible damage of the chemical bonds and thus a compositional change in the deposited film.