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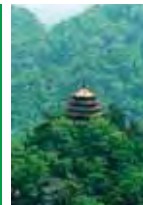
Innovative Biomaterials and Crossing Frontiers
in Biomaterials and Regenerative Medicine

Final Program

June 1-5, 2012, Chengdu, China

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- P-SAT-C-207 **Growth and Viability of Staphylococcus Epidermidis on Uv Irradiated and Fatty Acid-coated Smooth Titanium Surfaces (ID: 1986)**
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- P-SAT-C-208 **Polyacrylonitrile Nanofibrous Membranes with Superior Antibacterial and Easy-cleaning Properties through Hydrophilic Flexible Spacers (ID: 1764)**
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- P-SAT-C-209 **The Significance of Superparamagnetic-iron-oxide Nanoparticles for Prevention of Implant Infections (ID: 587)**
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- P-SAT-C-210 **Bioactive and Antimicrobial Graded Ceramic Implants with Enhanced Strength (ID: 507)**
Yu Zhang (New York University College of Dentistry, USA), Racquel Z LeGeros
- P-SAT-C-211 **Effect of ZnCl₂ on Plaque Growth and Biofilm Vitality (ID: 985)**
Haijing Gu (Sun Yan-Sen University, CHINA), Junqi Ling, Danni Fan
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Michael George Bryant (Univerisity of Leeds, UK), Xinming Hu, Richard Farrar, Robert Freeman, Ken Brummitt, Anne Neville
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- P-SAT-C-215 **Antibacterial Properties of Novel 1D ZnO Nanowires on Medical Grade 316L Stainless Steel Surface (ID: 392)**
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- P-SAT-C-216 **Effect of Sn Addition on the Magnetic Susceptibility of Zr-Nb Alloy Preventing Artifacts in MRI (ID: 2096)**
Naoyuki Nomura (Tokyo Medical and Dental University, JAPAN), Shun Nakagawa, Suyatatu , Ryota Kondo, Hisashi Doi, Yusuke Tsutsumi, Kazuhiko Noda, Takao Hanawa
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- P-SAT-C-219 **Caveolin-1: a New Biomarker of Cellular Response to Degradable Metallic Materials (ID: 3442)**
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- P-SAT-C-220 **Surface Patterning of NanoSiHA: in vitro Response from Osteoblasts (ID: 3041)**
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- P-SAT-C-223 **Enhanced Thrombogenic Response on Oxygen Etched Ti6Al4V Surfaces (ID: 1914)**
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- P-SAT-C-224 **Braided Stent for Transcatheter Aortic Valve (ID: 949)**
Coralie Marchand (Université De Haute Alsace/ Lpmt, FRANCE), Frederic Heim, Bernard Durand, Nabil Chakfe
- P-SAT-C-225 **Implant Survival and Marginal Bone Changes at Turned and Oxidized Implant Surfaces in Periodontitis Susceptible Smokers and Non-smokers. A Retrospective Case-Control Study. (ID: 418)**
Shariel Sayardoust (The Institute for Postgraduate Dental Education, SWEDEN), Kerstin Gröndahl, Eva

Titania nanotube coated with silver by plasma ion implantation and deposition

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Introduction

The implant is more widely applied in the clinic orthopedics and dental surgery. But perimplantitis remains one of the most serious complications and is usually difficult to treat [1,2]. The factor to the perimplantitis is the infection between the implant and bone, so antibacterial action is the key to prevent and inhibit the perimplantitis. The silver is a powerful bactericides and has a broad antibacterial spectrum [3]. The titania nanotube is a bioactive structure to bone cell function and is benefit to the osteointegration of bone and implant [4]. And the nanotube is a good substrate for antibacterial agent loading. We are aiming to load silver in the nanotube using a novel method plasma ion implantation and deposition (PIII&D).

Materials & Method

After polished, the pure titanium foil was anodized at a voltage of 20V in HF 0.5 vol % electrolyte to fabricate the titania nanotube array film. Then silver was implanted or deposited to the samples using the PIII&D at a bias of -0.1, -1 and 10 kV. And the surface characteristics were analyzed by SEM, EDS, XPS.

Results & Discussion

The SEM images in Fig. 1 show that only the group -1kV maintain titania nanotube structure which was attached a well-proportioned silver particle film. The EDS prove that this

film is formed of the implanted and deposited silver. The nanotube of group -10kV was all destroyed and that of group -0.1kV was covered completely by the silver. The XPS depth profile in Fig. 2 show that the surface content of Ag attached to the titania nanotube of group -1kV is about 30%, and the distribution depth is over 300nm which is same as the tube' length. And the surface content of Ag on the nanotube of group -0.1kV is about 85% but distribution depth is just 120nm which is a third of that of group 1kV. However silver almost wasn't implanted into the group -10kV titania nanotube of which the silver content is only about 0.25%. The different bias voltage loaded on the samples decides the results. The silver was only deposited on the nanotube surface at low bias, and at high bias the all silver was bombarded away.

Conclusion

The PIII&D is a feasible and efficient method to load Ag onto the titania nanotube, and the bias voltage is the key factor influencing the loading effect.

References

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- 2 Darouiche RO. *N Engl J Med*, 2004, **350**, 1422-9.
- 3 Alt V, Bechert T, Steinrucke P, Wagener M, Seidel P, Dingeldein E, et al. *Biomaterials*, 2004, **25**, 4383-91.
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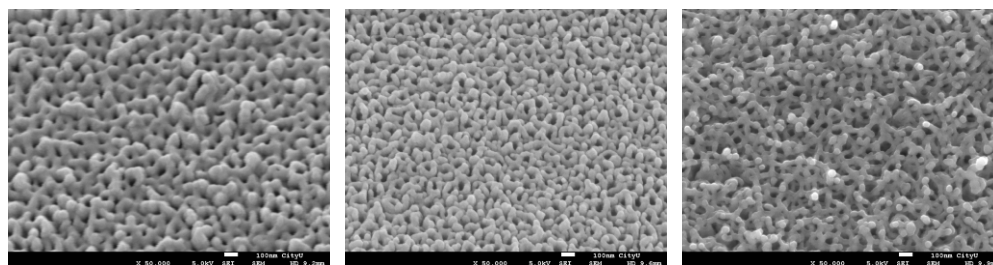


Fig. 1. SEM image of Ag loaded nanotube sample at bias of -0.1kV(left), -1kV(middle) and -10kV(right)

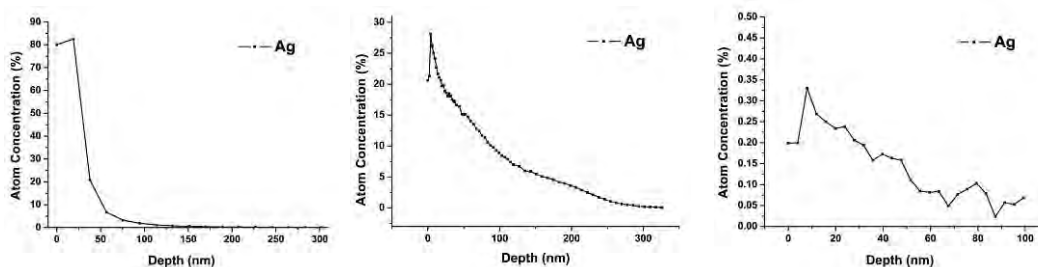


Fig. 2. XPS depth profile of Ag loaded nanotube sample at bias of -0.1kV(left), -1kV(middle) and -10kV(right)