Apparatus and Method for Nano Plasma Deposition

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Technology description

Unique coating process for improving the performance of medical devices and implants
Description
The success of medical implants is largely dictated by the interaction between the implant and the surrounding cells. Depending on the implant' s function, it may be necessary to either promote or prevent certain cell attachment. For example, coronary stents require endothelial cell attachment. For dental implants, it is important to prevent the attachment of fibroblast cells, while promoting the attachment of osteoblast cells. The interaction between cells and implants also plays a major role in the chances for infection. This is a critical issue within healthcare. Infections caused from biofilms on medical devices are estimated to cost the US healthcare system an estimated 40 billion dollars annually. This invention relates to several high energy plasma deposition processes that can effectively control the interaction between cells and implanted materials. It achieves this by changing the charge structure of the surface of the material, through adding or stripping electrons and atoms. Through this process, the properties of the implanted device can be customized to achieve optimum success.

Application area

Spinal Implants / Dental Implants / Ortho Trauma (osteoblast attachment)
Wound Care / Access Ports (antimicrobial surface)
Dialysis / PICC / CVC / Port Catheters (thrombus reducing surface)
Coronary Stents (endothelial cell attachment)
Coronary Stents (polymer-free drug elution surface)
Pacemakers (non-fracturing lead conductor)

Advantages

Provides excellent control over interaction between implant and cells
Imparts a variety of properties onto material surface, including strong antimicrobial properties
Promotes and prevents cell attachment where necessary

Institution

Northeastern University

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