Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Enhancing antibacterial properties of UHMWPE via ion implantation VINCENZO NASSISI, DOMENICO DELLE SIDE, LUCIANO VELARDI, Department of Mathematics and Physics - University of Salento, PIETRO ALIFANO, ADELFIA TALÀ, SALVATORE MAURIZIO TREDICI, Di.S.Te.B.A. - University of Salento — In the last decades, the demand for biomaterials of antimicrobial quality sensibly increased. The essential properties of these materials must be the biocompatibility, wettability, durability and their antibacterial characteristics. One of the most important biomaterial for medical applications is the ultra high molecular weight polyethylene (UHMWPE) that it is used to make components of prosthetic knee, hip and shoulder. It is well known that the presence in UHMWPE of Ag atoms increase its antibacterial properties while Cu and its alloys are known as natural antimicrobial materials. In this work it is proposed a dedicated laser ion source (LIS) accelerator to perform ion implantation together with a systematic study of the surface properties of UHMWPE samples treated with different metals in order to modify their antibacterial characteristics. The proposed technique consists in the application of a dose of specific ions inside the first layer of the sample to be treated. This goal can be effectively achieved if the ions are preventively accelerated. This technique seems to be interesting, since it can open the way to an easier realization of antibacterial materials using various metal ions.

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Date submitted: 14 Jun 2012 Electronic form version 1.4