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Effect of dual HiPIMS discharge parameters on formation and crystallography of antimicrobial Ti-Cu films RAINER HIPPLER, VITEZSLAV STRANAK, HARM WULFF, ROBERT BOGDANOWICZ, University of Greifswald, Germany, ZDENEK HUBICKA, Academy of Sciences of the Czech Rep., Institute of Physics, Prague, CARMEN ZIETZ, RAINER BADER, University of Rostock, Germany — The formation of thin Ti-Cu films at different conditions is studied as an important parameter of bone-contacting parts of joint endoprothese coating. Ti-Cu films provide an antibacterial effect combined with decent cellular adhesion of osteoblasts on the surface. These properties are strongly influenced by stoichiometry and crystallographic structure of the Ti/Cu films. The antimicrobial effect is caused by copper released from metallic structure. The Ti-Cu thin films were prepared by (i) dual pulsed magnetron sputtering at a repetition frequency of 4.65 kHz and (ii) dual High Power Impulse Magnetron Sputtering (HiPIMS) at a repetition frequency of 100 Hz. Crystallographic phases and chemical composition of deposited thin films are diagnosed by grazing incidence x-ray diffractometry, x-ray photoelectron spectroscopy, and energy dispersive X-ray spectroscopy. The copper release from the thin films after insertion into Dulbecco's Modified Eagle Medium is measured by absorption spectrometry. Results are compared and discussed together with time resolved plasma diagnostics (ion flux, Langmuir probe, optical emission spectroscopy).

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