Abstract Submitted
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Plasma polymerization for cell adhesive/anti-adhesive implant coating[1] JUERGEN MEICHSNER, University of Greifswald, HOLGER TESTRICH, INP Greifswald, HENRIKE REBL, BARBARA NEBE, University of Rostock — Plasma polymerization of ethylenediamine ($C_2H_8N_2$, EDA) and perfluoropropane (C_3F_8, PFP) with admixture of argon and hydrogen, respectively, was studied using an asymmetric 13.56 MHz CCP. The analysis of the plasma chemical gas phase processes for stable molecules revealed consecutive reactions: $C_2H_8N_2$ consumption, intermediate product NH_3, and main final product HCN. In C_3F_8-H_2 plasma the precursor molecule C_3F_8 and molecular hydrogen are consumed and HF as well as CF_4 and C_2F_6 are found as main gaseous reaction products. The deposited plasma polymer films on the powered electrode are strongly cross-linked due to ion bombardment. The stable plasma polymerized films from EDA are characterized by high content of nitrogen with N/C ratio of about 0.35. The plasma polymerized fluorocarbon film exhibit a reduced F/C ratio of about 1.2. Adhesion tests with human osteoblast cell line MG-63 on coated Ti6Al4V samples (polished) compared with uncoated reference sample yielded both, the enhanced cell adhesion for plasma polymerized EDA and significantly reduced cell adhesion for fluorocarbon coating, respectively. Aging of the plasma polymerized EDA film, in particular due to the reactions with oxygen from air, showed no significant change in the cell adhesion. The fluorocarbon coating with low cell adhesion is of interest for temporary implants.

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