

Biocompatible calcium phosphate coatings on titanium substrate

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Three different methods have been compared for preparing bioactive coatings on a titanium substrate – electrochemical deposition from electrolytes containing calcium nitrate and ammonium dihydrophosphate under cathodic polarization of titanium, plasma-electrolytic oxidation of titanium in solutions containing calcium citrate and ammonium dihydrophosphate and chemical modification of mesoporous anodic TiO₂ films by calcium phosphate nanoparticles. The coatings prepared by cathodic electrodeposition demonstrate a low adhesion to the Ti substrate and consist of 30–80 % brushite, 20–70 % tricalcium phosphate and 5–22 % hydroxyapatite. Plasma-electrolytic oxidation leads to the formation of rather hard amorphous TiO₂ films containing calcium pyrophosphate. Fairly good adhesion and excellent biocompatibility has been revealed for mesoporous anodic TiO₂ films chemically modified with hydroxyapatite nanoparticles.