

NANOCRYSTALLINE CALCIUM ORTHOPHOSPHATE COATINGS ON Ti AND Mg SUBSTRATES: OBTAINING, CHARACTERIZATION AND TESTING IN SBF

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Calcium orthophosphates belong to the categories of bioactive and bioresorbable substances and due to it are of interest in bone-interfacing implant applications. In this work for obtaining calcium phosphates (brushite — $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$ and hydroxyapatite — $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$) on Ti and Mg substrates, we applied two technologies: a thermal substrate method (TSM) in aqueous solution, proposed by K. Kuroda in 2002 and developed by our group [1, 2] (for Ti) and a dipping method (DM) (for Mg). It was shown that TSM is very suitable for fast formation of uniform coatings on Ti and $\text{Ti}_6\text{Al}_4\text{V}$ substrates at low temperatures, with chemical composition and film thickness been controlled. Investigations were conducted to examine the properties of the coatings produced on untreated and chemically pre-treated substrates as well as the bioactivity of HA coatings subjected to soaking with a simulated body fluid (SBF) for 7 days. DM was proposed for hydroxyapatite (HA) and brushite (BS) deposition onto Mg substrates. The influence of magnetic field (0.3 T), namely proximity of the south and the north poles of magnet on the crystallization of HA deposition was also investigated. One of the conclusions is that the coated with HA and BS magnesium substrates show less increasing of pH of the SBF solution. Such coatings successfully improve the corrosion resistance of Mg.

References

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