**Corrosion mechanism of Mg20Zn alloy protected by chitosan coatings.**

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In recent years magnesium and its alloys became more and more attractive as an implant material for orthopedics. Comparing to existing implant materials. Magnesium exhibits mechanical properties close to human bones (elasticity modulus, density) and it is biodegradable, non-toxic, non-allergic. These properties make magnesium and its alloys extremely attractive, at first, for biomedical studies and as a result promising material for orthopedic applications.

Magnesium is very reactive metal especially in aggressive environments rich on Cl- ions. To protect magnesium alloys against corrosion chitosan based biodegradable coatings can be used. In this study, chitosan coatings modified by addition of titanium dioxide and hydroxyapatite nanoparticles were deposited on Mg20Zn alloy by using spin-coating technique. To investigate corrosion behaviour the following electrochemical methods have been applied: electrochemical impedance spectroscopy (EIS) and Linear Sweep Voltamperometry (LSV). The corrosion tests have been performed in the Hank’s solution (temperature 37°C and pH 7.2). The morphology of the chitosan-based coatings before and after corrosion tests has been investigated by means of FE-SEM (Field Emission Scanning Electron Microscopes). The structure of the chitosan coatings has been investigated by using a Fourier Transform Infrared (FTIR) Spectrometer.

Hydroxyapatite (HA) particles were homogeneously distributed in the chitosan matrix, while titanium dioxide nanoparticles formed an agglomerate located preferentially on the intermetallic phase Mg51Zn20. The exposition of the specimens for 24 hours in the Hank's solution has revealed the formation of some cracks in the coatings. The electrochemical measurements have proved better corrosion resistance of Mg20Zn alloy covered by chitosan coatings containing the TiO2 nanoparticles.

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