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## **THE CORROSION PROPERTIES OF ZIRCONIUM AND TITANIUM LOADBEARING IMPLANT MATERIALS WITH PROTECTIVE OXIDE COATINGS**

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Good mechanical properties, coupled with excellent biocompatibility and corrosion properties have made titanium and alloys the most popular materials for biomedical applications. But more demanding expectations for orthopedic and trauma defects reconstruction are driving the development of alternative bearing materials. Zirconium and alloys are presented as alternative to other load-bearing materials in order to increase the biocompatibility for needs of metal sensitive (Ti, V, Al) patients. The comparative analysis of corrosion properties of zirconium and titanium materials with novel oxide coatings deposited by reactive magnetron sputtering (RMS) method is of great interest for next biomedical applications.

At present study the protective properties of ZrO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> oxide coatings deposited by reactive magnetron sputtering (MS) method on zirconium and titanium-based material (Ti4Al6V) and also the coatings adhesion, hardness and elastic modulus were evaluated. The corrosion examinations of anodic polarization by potentiodynamic method, Tafel and Stern curves and also impedance method at SBF solution were made by potentiostat PARSTAT 2263. The surface topography and roughness parameters was investigated by interferometry microscopy Talysurf CCI, SEM and AFM methods. The results show that the best corrosion resistance characteristics at SBF solutions have the oxide coated ZrO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> samples both on zirconium and titanium-based substrates. Zirconium with oxide coatings demonstrates the excellent protective properties and presents as alternative load-bearing material for various biomedical applications.

### **Keywords**

magnetron sputtering  
oxide coatings  
biocompatibility