عنوان مقاله:

The Effect of Substrate Temperature on Structural, Adhesion and Corrosion Behavior of HA / ZrN Coated AZ۹۱ Magnesium Alloy Created by Ion Beam Sputtering

محل انتشار:

مجله علوم و مهندسی خوردگی, دوره 7, شماره 23 (سال: 1395)

تعداد صفحات اصل مقاله: 18

نویسنده:

خلاصه مقاله:

In this study, the ion beam sputtering method was used to deposit the optimized ZrN coating with ۱ µm thickness on AZ۹۱ magnesium alloy at ۴۰۰ °C and then the HA coatings were created on them at temperatures of ۱۵۰ °C, ۲۰۰, ۲۵۰, ۳۰۰, and ۳۵۰ °C for ۳۶۰ minutes. The profilometry and indentation methods for thickness and film adhesion evaluation showed that, from ۱۵۰ to ۳۰۰ °C the thickness decreases from ۸.۱ µm to ۳.۳ µm and dp/dr ratio increases from ۰.۰۷ to ۰.۲ kg/µm. The analysis of the x-ray diffraction pattern by Williamson - Hall method showed that, by increasing the temperature to ۳۰۰ °C the grain growth is dominated therefore the grain size reaches to ۰.۳۶ µm, but with increasing the temperature to ۳۵۰ °C, grain size decreases to ۰.۱۲ µm. The potentiodynamic polarization test showed that, all coated samples have corrosion potential close to AZ۹۱ about ۱.۵۴ Volt vs. SCE and the corrosion current density in the deposited samples at ۳۰۰°C showed the minimum current density about ۰. ۳۳ µA/cm۲.

کلمات کلیدی:

biomaterials, adhesion, particles escape, corrosion potential, corrosion current,
بیومواد, چسبندگی, فرار ذرات, پتانسیل خوردگی, جریان خوردگی