عنوان مقاله:

Effect of Zn and porosity on the biodegradability and Mechanical Properties of Mg-Zn Scaffolds

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خلاصه مقاله:

In the present research porous Mg-Zn scaffolds with different Zn amount and porosities were synthesized by powder metallurgy process as potential degradable materials for orthopedic applications. The microstructures, composition, mechanical properties and in vitro biodegradability of the scaffolds were investigated. Optic microscopy (OM) images showed that the Mg-Zn scaffolds exhibit homogeneously distributed and interconnected pores with the size of about ۱۵۰–۴۰۰ µm. The X-ray diffractometer (XRD) results indicated the formed intermetallics consist of Mg۱۲Zn۱۳ and Mg۵۱Zn۲۰ in the Mg matrix. Compressive tests showed that decrease of porosity and the addition of Zn increases the compressive strength of specimens. Electrochemical tests indicated that with increase of porosity, the corrosion current density of scaffolds increased and Mg-Zn scaffolds synthesized improved the in vitro biodegradability property of the Mg; the best biodegradability property was obtained with ۳% Zn and the porosity of about ۷% ; further increase of Zn content up ۴% deteriorates biodegradability. It is found that the products of immersion in simulated body fluid (SBF) are identified to be HAP, (Ca,Mg)۳(PO۴)۲ and Mg(OH)۲ and MG۶۳ cells adhere and proliferate on the surface .of the scaffolds, making them a promising choice for orthopedic application

کلمات کلیدی:

Porous Scaffold, Mg-Zn, Mechanical Properties, In Vitro biodegradability, Powder Metallurgy