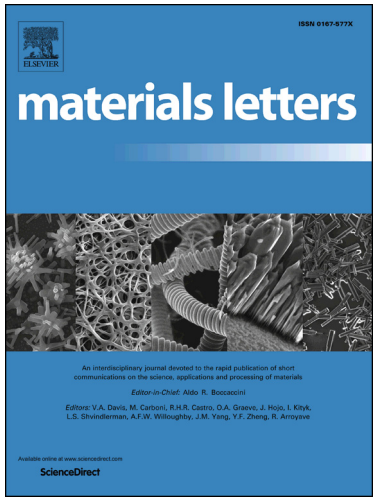

Corrosion resistance, anticoagulant and antibacterial properties of surface-functionalized magnesium alloys

Yuliang Pei, Guannan Zhang, Chao Zhang, Jiameng Wang, Ruiqiang Hang, Xiaohong Yao, Xiangyu Zhang

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Corrosion resistance, anticoagulant and antibacterial properties of surface-functionalized magnesium alloys

Yuliang Pei, Guannan Zhang, Chao Zhang, Jiameng Wang, Ruiqiang Hang, Xiaohong Yao*, Xiangyu Zhang**

College of Materials Science and Engineering, Taiyuan University of Technology, Taiyuan 030024, P. R. China

Abstract

Impressive progress has been made on the development of magnesium alloys (Mg) implants in cardiovascular and orthopedic applications due to their good mechanical strength and biodegradable. In this paper, heparin and carboxymethyl chitosan were immobilized on alkali-treated Mg to improve the hemocompatibility and antibacterial activities. Electrochemical tests revealed that the surface modified Mg obviously improved the corrosion resistance. Additionally, the surface-functionalized Mg exhibited excellent antithrombotic and antibacterial activities.

Keywords: Biomaterials; Magnesium alloys; Functional; Corrosion; Anticoagulant properties; Antibacterial properties

1. Introduction

Magnesium alloys (Mg) have been attracting increasing attention as biodegradable metals for clinical applications because of their biodegradation and mechanical properties [1-2]. Unfortunately, the biggest challenge hampering their clinical application is the fast corrosion rate [3]. Additionally, thrombus formation and bacterial infections also hinder their clinical application in some cases [4]. In order to overcome these shortcomings, a series of surface modification methods have been attempted [5-6]. However, the current methods focus on solve some problems alone and cannot simultaneously impart excellent corrosion resistance, anticoagulant and antibacterial activities.