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Comparative study on the biodegradation and biocompatibility of silicate bioceramic coatings on biodegradable magnesium alloy as biodegradable biomaterial M. RAZAVI, School of Materials Science and Engineering, Oklahoma State University, USA, M.H. FATHI, Materials Engineering, Isfahan University of Technology, Iran, O. SAVABI, S.M. RAZAVI, School of Dentistry, Isfahan University of Medical Sciences, Iran, B. HASHEMIBENI, School of Medicine, Isfahan University of Medical Sciences, Iran, M. YAZDIMAMAGHANI, School of Chemical Engineering, Oklahoma State University, USA, D. VASHAEE, School of Electrical and Computer Engineering, Oklahoma State University, USA, L. TAYEBI, School of Materials Science and Engineering, Oklahoma State University, USA — Many clinical cases as well as in vivo and in vitro assessments have demonstrated that magnesium alloys possess good biocompatibility. Unfortunately, magnesium and its alloys degrade too quickly in physiological media. In order to improve the biodegradation resistance and biocompatibility of a biodegradable magnesium alloy, we have prepared three types of coating include diopside (CaMgSi2O6), akermanite (Ca2MgSi2O6) and bredigite (Ca7MgSi4O16) coating on AZ91 magnesium alloy through a micro-arc oxidation (MAO) and electrophoretic deposition (EPD) method. In this research, the biodegradation and biocompatibility behavior of samples were evaluated in vitro and in vivo. The in vitro analysis was performed by cytocompatibility and MTT-assay and the in vivo test was conducted on the implantation of samples in the greater trochanter of adult rabbits. The results showed that diopside coating has the best bone regeneration and bredigite has the best biodegradation resistance compared to others.

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