Structural, mechanical and in vitro corrosion characterization of as-cast magnesium based alloys for temporary biodegradable medical implants

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Magnesium based alloys are light-weight materials having a good strength to weight ratio making them of interest for many structural applications in automotive and aerospace industry. Besides, magnesium is also considered as promising metal for construction of temporary biodegradable medical implants like stents or fixation devices for fractured bones. A biodegradable implant progressively corrodes in the human body fluids and is replaced by the healing tissue. No second surgery is needed to remove the implant after the bone has healed. The advantage of magnesium is that it is relatively non-toxic metal and that its mechanical characteristics (strength, Young´s modulus) are close to those of natural bone. But pure magnesium is not very suitable, because it has a low strength and too high corrosion rate in comparison with the rate of bone tissue healing. Therefore, a great effort has been devoted to find suitable magnesium based alloys which possess sufficient strength levels and low corrosion rates in the human body. This paper presents structural, mechanical and corrosion properties of magnesium based alloys containing zinc, rare earth metals and zirconium as the main alloying elements.

Keywords: magnesium, biodegradable implant, corrosion, mechanical properties

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