Structure and Properties of Zn-Mg Alloys for Medical Implants

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Polymeric materials are used in modern medicine for the fixation of fractured bones. Their function is only temporary - they serve as substitutes till they are replaced by human tissue (without additional reoperation). Their disadvantage is that they possess low mechanical strength and hardness. As an alternative to polymeric materials, the metallic fixation components are being developed. Their advantage is the higher value of strength, toughness and hardness. Zinc alloys represent a new trend in this technological field. They also meet the requirements for biocompatibility and their mechanical properties approach the properties of human bones. In this paper, the structural and mechanical characteristics are described. The only alloying element in the zinc alloys examined was magnesium in the range 0-8.3 wt. %. The mechanical properties were discussed in the relation to the microstructure and the phase composition of the alloys. The results showed that the mechanical properties of binary Zn-Mg alloys increase with the growing content of Mg with the maximum achieved at the eutectic composition. Higher magnesium content strongly deteriorates the mechanical properties of these alloys.

Keywords: Biodegradable material, Zinc, Mechanical properties, Structure

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