

MICROSTRUCTURE AND CORROSION OF ZN-MG-CA TERNARY ALLOYS

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Zinc-based alloys are considered as alternative possibility compared to magnesium in the case of the development of biodegradable materials for medical applications. The main reasons are related to the low corrosion rate, the absence of hydrogen evolution during degradation in an organism, biocompatibility of Zn and possibility to improve mechanical properties of Zn by suitable alloying. In such case, Mg and Ca which represents essential elements in the human organism are considered as good candidates. Present paper brings the knowledge about microstructure, mechanical and corrosion properties of Zn-0.8 Mg-0.2 Ca ternary alloy in the as-cast, thermally treated and as-extruded conditions. Obtained results indicate that microstructure conditions in the as-cast state are affected by cooling rates. Thermal treatment affects the alloy phase composition, although solubility of Mg and Ca in Zn is neglectable. The changes of microstructure directly affect mechanical properties of prepared materials. Processing by extrusion causes a significant increase of mechanical properties with the values of UTS over 300 MPa. Corrosion rates of variously processed materials are similar and no significant changes were observed in simulated body fluid

Biography

Jiří Kubásek has completed his PhD in Properties of magnesium alloys usable as biodegradable materials from UCT Prague in 2017. He lectures at the UCT Prague and is also responsible for the management of the Diploma and Bachelor thesis. His scientific research is focused on the development and characterization of magnesium- and zinc-based biodegradable materials. He also works at the Institute of Physics of the Czech Academy of Sciences, where he participates on the studies related to the processing of the surface of various materials by laser peening. He has published more than 27 papers in high impact journals and more than 15 papers in other reputed journals presented on SCOPUS.

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