

Biodegradable biomaterials based on magnesium is a new group of biomaterials with high potential to use in medicine, which after fulfil their role will be gradually dissolved and removed from the body without removal surgery. From the biocompatible elements magnesium has the greatest potential to use in production of biodegradable implants. Properties of magnesium are very close to the human bones and large amounts of it can be found in the body. One of the main limitations of magnesium it is his weak corrosion resistance in the human body fluids.

The novelty of proposed project is usage of intermetallics based on magnesium as a potential biomaterials. Intermetallics owing to strong atomic bonds offers many attractive properties in a structural applications. The application of intermetallics should improve both mechanical and corrosion properties of the biodegradable materials based biomaterials.

The aim of this project is to develop a new generation of biomaterials based on magnesium-zinc intermetallics and other nutrition elements and their composites with addition of bioceramic with a strictly specified chemical and phase compositions, surface morphology and show higher hardness, better resistance to corrosion in body fluids and good biocompatibility with human tissues. Surface modification of implant based of Mg-intermetallics by anodization and biomimetic deposition methods can provide a better bioactivity of implant.

Magnesium intermetallics and bioceramics powders after initial mechanical alloying process will be compacted, followed by the sintering process. Surface modifications of intermetallics by anodization and biomimetic deposition of oxide and apatite layers will improve the biocompatibility of studied materials. During this project we are going to investigate and optimize production process of magnesium based intermetallic biomaterials. Structure, morphology, mechanical properties and corrosion resistance of produced materials will be studied to determine optimal parameters of production process biodegradable intermetallics based on magnesium-zinc intermetallics.

Biodegradable structures developed in this project will be highly beneficial in the development of societies and due to their future application in medical applications.