Seminar

The influence of laser micro-processing with a deconcentrated photon beam on the structure and phase formation of TiAu thin films for blood contact materials

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Resume

The seminar explores the impact of laser micro-processing using a deconcentrated photon beam on the structural and phase formation properties of TiAu (Titanium-Gold) thin films, which are used in biomedical applications. TiAu is of great interest due to their biocompatibility and corrosion resistance. The seminar will discuss how laser processing techniques influence the microstructure, crystallinity, and phase transformations within these films. It will also examine how these changes affect the mechanical and surface properties essential for optimizing the performance and durability of blood-contact materials. The improvement of the functional properties of titanium and its alloys is possible thanks to the formation of Ti3Au grains which due to the crystallization in A15 cell possesses structure with naturally short Ti-Au bonds and high (14) coordination number of Ti atoms with high valence electron density. The Ti3Au intermetallic formation inhibits dislocations and results in high hardness of materials surface layers. The current research focuses on adapting a method to increase the proportion of Ti3Au grains in the surface layer of the titanium-based material and its biphasic TiZrNb alloy, which is a modern material used in implants into the human body.

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