

Advances in Alloys Research and Technologies

Advances in β -titanium Alloys for Applications in the Biomedical Fields

Bolokang, Amogelang S
Council for Scientific and Industrial Research (CSIR)
Meiring Naude Drive, Pretoria, 0184
Email: SBolokang@csir.co.za

The advances in biocompatibility, structural properties, application and processing techniques of beta (β)-titanium alloys are presented. These alloys are promising future biomedical alloys due to their low modulus of elasticity (MOE), and non-toxic elements. The biocompatibility of these alloys exhibits a low modulus of elastic (MOE) closer to that of human bone ~ 30 GPa. On one hand, the best mechanical properties and performance of the alloys is found in porous materials. Particularly, porous Ti-24Nb, Ti-35Nb and Ti-42Nb alloys exhibit reduced hardness with elastic modulus values of 11, 18.0 and 11.2 GPa, respectively. Furthermore, advanced processes such as additive manufacturing including selective laser manufacturing (SLM) and directed energy deposition (DED) are gaining traction in the manufacturing industry.