

Beta Titanium Alloys: The Lowest Elastic Modulus for Biomedical Applications: A Review

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Abstract : Biometallic materials are the most important materials for use in biomedical applications especially in manufacturing a variety of biological artificial replacements in a modern worlds, e.g. hip, knee or shoulder joints, due to their advanced characteristics. Titanium (Ti) and its alloys are used extensively in biomedical applications based on their high specific strength and excellent corrosion resistance. Beta-Ti alloys containing completely biocompatible elements are exceptionally prospective materials for manufacturing of bioimplants. They have superior mechanical, chemical and electrochemical properties for use as biomaterials. These biomaterials have the ability to introduce the most important property of biochemical compatibility which is low elastic modulus. This review examines current information on the recent developments in alloying elements leading to improvements of beta Ti alloys for use as biomaterials. Moreover, this paper focuses mainly on the evolution, evaluation and development of the modulus of elasticity as an effective factor on the performance of beta alloys.

Keywords : beta alloys, biomedical applications, titanium alloys, Young's modulus

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