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## Composition optimization of low modulus and high-strength TiNb-based alloys for biomedical applications

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### Abstract

The effect of chemical composition on microstructure and tensile properties of a series of low modulus Ti-Nb-Cu-Ni-Al alloys was studied. These alloys consist of primary micrometer-sized  $\beta$ -Ti dendrites surrounded by intermetallic phases. The morphology of the intermetallic phases is strongly affected by composition. Due to the composite microstructure, the alloys exhibit a low Young's modulus (77 – 84 GPa) together with a high yield strength of about 1000 MPa as well as moderate tensile ductility. The results demonstrate that complete substitution of Al by Ti reduces the Young's modulus by 5 %. Increasing Nb content at the expense of Ti causes a significant improvement of tensile ductility.

Keywords: titanium alloy; biomedical alloy; implant material; low Young's modulus; deformation mechanism

### Introduction

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