

## **Developing high performance titanium-copper alloys enabled by additive manufacturing**

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Titanium alloyed with a certain amount of copper is reported to have excellent anti-bacterial properties, good biocompatibility and corrosion resistance for dental applications. However, conventionally cast Ti-Cu alloys are not strong enough even after artificial aging. Given the unique advantages of very high cooling rates and multiple thermal cycles, additive manufacturing (AM) opens a new opportunity to produce high performance Ti-Cu alloys. In this study, a series of Ti-xCu binary alloys ( $4 \leq x \leq 10$  wt. pct.) were produced by direct laser deposition (DLD). The effect of Cu concentration on the microstructure, porosity and mechanical properties of the AM Ti-Cu alloys has been comprehensively studied. In addition, the performance of AM Ti-Cu alloys was also compared with their cast counterparts in terms of the mechanical properties and anti-bacterial capability.