

**Title:** The Relation of The Uniformity of Composition and The Mainly Mechanical Properties of AlSi10Mg by Microanalysis in SLM

**Abstract:** In order to search the relationship of microstructure and mechanical properties of metal 3D printing, the comprehensive properties of metal 3D printing through the comparison of 3D printing aluminum alloy and cast aluminum alloy were studied in the following three aspects: microstructure, hardness and tribological property. The experimental results show that the grain structure of 3D printing aluminum alloy was finer than cast aluminum alloy, and the distribution of various alloy elements was more uniform. which caused the hardness of 3D printed aluminum alloy was slightly higher than cast aluminum alloy in hardness testing. Similarly, the coefficient of friction of 3D printing aluminum alloy was smoother than cast aluminum alloy. And the friction coefficient and the weightlessness rate were smaller than casting in friction and wear tests.