

MULTI-MATERIAL PROCESSING: HYBRID DISK-SHAPED PARTS WROUGHT AA6061 & AM-SLM AlSi10Mg

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ABSTRACT

Multi-material processing was successfully carried out for AA6061 aluminum wrought alloy and AlSi10Mg for SLM to produce hybrid components. The interface formed during the SLM process was analyzed at the bonding zone between the two materials. Preliminary investigation revealed that a good metallurgical bonding was obtained at the boundary created between the AA6061 aluminum wrought alloy and AlSi10Mg AM-SLM material. This was validated by ultrasonic testing and observed by optical and electron microscopy. As expected, a highly refined microstructure was obtained due to rapid solidification during SLM and the macrostructure was not changed at the interface following solidification, bonding and a T5 heat treatment. Microhardness results show that the interface exhibited different values than the bulk materials stemming from the chemical mixing that occurred during melting. This work showed the feasibility of creating hybrid components combining additive manufacturing with conventional fabrication methods.

KEYWORDS: AM-SLM, AlSi10Mg, wrought 6061, hybrid parts, interface characterization

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