

Obtaining parts through selective laser melting (SLM) with metallic or metal-ceramic powders surface-modified using fluidized bed technology.

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Selective laser melting (SLM) is emerging as a key component in the future of the industry due to its ability to produce complex parts efficiently. SLM offers significant time, material, and cost savings, as well as increased versatility and the potential for novel properties. However, the production of metallic or metal-ceramic components using SLM still faces challenges. These include the limited range of available raw materials, low reproducibility, and microstructural defects, such as large columnar grains, cracks, and pores, which are common in the final components produced. To solve these problems, it is necessary to adapt raw materials to the characteristics of additive manufacturing (AM) processes.

To address these problems, surface modification of powders was carried out using fluidised bed technology to enable the large-scale development of new smart hybrid powders usable in additive manufacturing processes. The obtained powders were evaluated by different techniques to observe certain characteristics such as flowability, morphology, chemical analysis and packing which are key to obtain raw materials adapted to additive manufacturing. Optimal characteristics were found for use in equipment in AM processes. Furthermore, these powders were evaluated to observe the influence on the processability of the parts as well as the effect of the printing parameters using SLM techniques. Finally, the parts obtained by SLM were analysed by evaluating their microstructure, grain size, phases and the effects produced by the modification of the powders.

KEY WORDS: Additive manufacturing, surface modification, fluidized bed, selective laser melting.