

THE SDS PROCESS: A VIABLE WAY FOR THE PRODUCTION OF METAL PARTS

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Abstract

One of the most commonly used methods for the additive manufacturing of metal parts is Selective Laser Melting (SLM). However, SLM requires the use of expensive equipment. In the ongoing European project ReProMag we develop a second route we call 'SDS Process'. SDS means Shaping-Debinding-Sintering not only for injection moulding but also for Additive Manufacturing.

Here Fused Filament Fabrication (FFF) in combination with debinding and conventional sintering could be a less expensive alternative for the fabrication of complex metal parts. The process is similar to metal injection moulding (MIM), which is already an established technology for the fabrication of metal parts with complex geometry. The main advantage of shaping by FFF instead of injection moulding is the flexibility of parts that can be produced without having to use expensive moulding tools. Therefore, for the production of unique or short lot parts FFF could be a viable alternative.

In this paper the production of parts made out of stainless steel and titanium via FFF, debinding and sintering is described. The first step was the development of an appropriate binder system that can provide flexibility and strength to filaments containing 55%vol of metal powders. The second step was the production of round filaments with the appropriate dimensions for a conventional FFF printer. Printing trials were performed and the printing parameters were determined, followed by the determination of the debinding parameters in an appropriate solvent. Finally sintering was performed to obtain solid pieces of stainless steel and titanium.

References

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