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Strukturleichtbau Kunststoffverarbeitung

Selective laser melting of a new medium manganese steel alloy for automotive industry

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In the last few years Additive Manufacturing has established itself in many branches of business. Especially in the automotive industry, the technology of powder-based laser additive melting (LAM) is eminently suitable for the production of customized, high-performance lightweight parts and geometrically complex components. Currently the range of usable materials is limited to a few titanium, nickel, aluminium, cobalt-chromium alloys, as well as some stainless steels and tool steels. Therefore, development of new powder alloys for the LAM - process is required. Medium manganese steel alloys are distinguished materials due to adjustable mechanical properties, such as high strength and significant ductility, which are beneficial for automotive applications. However, the comparatively difficult processing of a medium manganese steel is bounded by the resulting densities, among other limitations.

The aim of the work was to develop suitable and robust LAM process parameters for medium manganese steel combined with heat treatment to create microstructures that possess advanced mechanical properties.

During the development, material densities of approx. 99.98 % could be achieved (Figure 1). The mechanical investigations are determined by static load in the second step.

Due to the processing of the new manganese steel alloy and the resulting mechanical properties, new application potentials can be realised e.g. in automotive future body-in-whites structures.

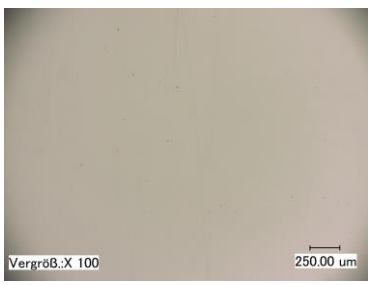


Figure 1: high density of medium manganese steel

Biography

Bernd Schob graduated his mechanical engineering studies at Westsächsische Hochschule Zwickau in 2007 and graduated his economics studies at Technische Universität Freiberg in 2015. Since 2016, he is a research assistant at Technische Universität Chemnitz, Department of Mechanical Engineering. His research focus is on Additive Manufacturing, ~~selective laser melting (SLM), especially~~specialising in processing of new materials and development of material parameters in ~~selective laser~~laser additive ~~melting~~manufacturing (~~SL~~LAM).

Kommentiert [A1]: Einmal LAM einmal SLM?

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