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## Development of Al alloys for additive manufacturing

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Additive manufacturing (AM) technology is being adopted in more and more industries and the focus of research and development is shifting to the materials in use. However, limited processability of high-performance materials restrict the robustness of the process in some cases, while in other cases the best materials for a given application cannot be processed at all. Currently only a few alloys can be reliably processed by this methodology, and in particular the number of different aluminium alloys available for AM is still rather limited. The main reason is that the strongest Al alloys, which get their strength from precipitation hardening, contain highly volatile elements such as Zn, Mg, etc. leading to turbulent pools, pores and low mechanical properties. This talk will review ongoing research on development of the innovative aluminium alloy specifically designed for SLM. Two different approaches will be presented: on one hand, on tailoring the chemical composition to improve processability, specifically crack susceptibility, of wrought aluminium alloys of the 7xxx series (Al-Zn alloys) to increase mechanical resistance of weldable casting grade AlSi10Mg alloy. A special emphasis will be placed on powder production by gas atomization as a first and an important step in alloy development for additive manufacturing. It will be demonstrated how the desirable compositions can be achieved and what are the main challenges faced. Also the properties of the powders will be assessed and suitability for SLM demonstrated.

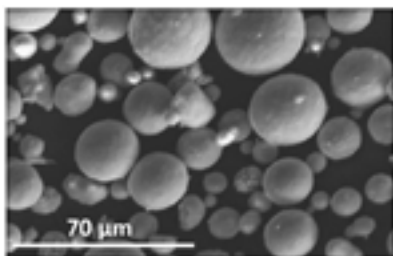


Figure 1: Highly spherical powder of an Al alloy.



Figure 2: Hardness of the produced powders

## Biography

Srdjan Milenkovic obtained a PhD in 2002 from the State University of Campinas, Brazil. He joined the Department of Materials Technology at the Max-Planck-Institute for Iron Research (MPIE) in Düsseldorf, Germany, as a Research Associate. Since March 2011, he was appointed as a Head of the Solidification Processing and Engineering group at the IMDEA Materials Institute. His research expertise includes advanced solidification processing techniques with special emphasis on gas atomization of powders for additive manufacturing and development of novel high-throughput casting methods. He has published over 55 papers in JCR journals, among which two in Nano Letters with impact factor >10.

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