

MICROSTRUCTURE OF SINGLE TRACK AND BULK STAINLESS STEEL 316L FABRICATED BY LASER POWDER BED FUSION

Lina Ji^{1,2}, Sen Wang^{1,2}, Jiquan Liu^{1,2}, Wenjie Wu^{1,2}, Shuqian Fan^{1,2}

¹Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, CN

²Chongqing Key Laboratory of Additive Manufacturing Technology and Systems, CN

Single track printing is one of the basic units for additive manufacturing technique, which has significance on the process optimization and quality improvement of the final printed products. Single track printing of stainless steel 316L was studied and the morphology and microstructure of the molten pool were analyzed. The result showed that columnar grains were easy to grow perpendicular to the boundary of the molten pool due to the large temperature gradient, whereas equiaxed grains were prone to appear far away from the boundary. The cell spacing decreased with scanning speed increased, however, it did not change much with different laser power. The lattice parameters decreased with the decrease of laser volumetric energy density due to the phase reorganization. The microstructure of the printed pieces was anisotropic with equiaxed and columnar dendritic substructures alternative for the top surface. However, for the side surface, columnar dendritic substructures could grow across the interlayers and even through the whole surface.

Biography

Lina Ji has completed her PhD in condensed matter physics at the age of 29 years from Institute of Physics, Chinese Academy of Sciences and postdoctoral studies from Singapore National University and University of Minnesota. After that, she joined the 3D printing Center in Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences as an associate professor. Her research is mainly on additive manufacturing of refractory materials and metal-matrix composites. She has published more than 25 papers in top journals.

lnji@cigit.ac.cn, lnji09@126.com