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MICROSTRUCTURE AND MECHANICAL PROPERTY CHARACTERIZATION OF INCOL718 ALLOY SPECIMEN PRINTED BY SELECTIVE LASER MELTING

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Incol718 alloy specimens were fabricated by the selective laser melting (SLM) method. The effect of parameters such as laser power and scanning speed on the microstructure and mechanical properties were investigated. It is found the energy density, a function of laser power, scanning speed and hatch distance is greatly related to the mechanical properties. The specimen fabricated with laser power 200 W, scanning speed 1000 mm/s, and hatch distance 0.1 mm and layer height 0.02 mm achieved best mechanical properties. The as-fabricated tensile strength reaches 800 MPa in the fabrication direction, 15% higher than the standard property, while the elongation keeps 32%. Its microstructure in the vertical section is regular columnar grains, 20 μm wide. The stack of the melt pools are regular, and the level of each layer is smooth. The soundness and columnar grains result its high mechanical property.

Biography

Jinwu Kang has received his PhD from Tsinghua University. He is an Associate Professor of School of Materials Science and Engineering, Tsinghua University. He performed his research as Research Scientist at Worcester Polytechnic Institute, USA from May' 2001 to Jan' 2003. He has been doing research about the modelling and simulation of casting and heat treatment processes of casting, 3D printing of sand moulds and metallic parts in recent years. He proposed the description methods for the deformation of castings, intensive riser cooling of castings after their solidification and 3D printed hollow mould for castings to realize controlled cooling at whole scale. He has published 170 papers and received four academic awards from the Ministry of Education, China for his distinguished research. He is the Chief Editor of Materials Science and Engineering International Journal.

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