

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

Poster Session (P)

Author: Dr. Peng Dong

China Aerospace Science and Technology Corporation (CASC), China

PRELIMINARY STUDY ON LASER BEAM WELDABILITY OF DIRECT LASER FABRICATED
GH4169 FOR AEROSPACE APPLICATIONS**Abstract**

GH4169 nickel-base superalloy is applied extensively in the form of structural components for the aerospace applications, due to its excellent mechanical strength and resistance to creep at high temperatures. However, it is very difficult to make complex GH4169 structural components by traditional machining, because of its special mechanical properties. In past few years, the aerospace industry has paid more attention to researching and developing a new technique for manufacturing complex GH4169 structural components efficiently. Direct laser Fabricated (DLF) is a rapid additive manufacturing process based on laser cladding and rapid prototyping. In recent years, DLF has been recognized as an advanced process for manufacturing complex GH4169 structural components, because of its own advantages like ability to fabricate complex shapes, no requirement of mould, high processing efficiency. However, by the limitation of the DLF process, the fabricated GH4169 components may not be applied directly. They require some post-treatments like welding or heat treatment. In this paper, laser beam weldability of direct laser fabricated GH4169 samples were study preliminarily. Different fabricating orientation samples, wrought- fabricated dissimilar samples with the thickness of 3mm were welded. The macro- and microstructure of the joints were observed by means of optical microscopy (OM), scanning electron microscope (SEM) and the mechanical property of the joints were assessed by microhardness and tensile test. The results showed well laser beam weldability of direct laser fabricated GH4169.