

Effect of laser surface modification on SS316L surface roughness and laser heating temperature

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ABSTRACT

Nowadays, stainless steel is widely used in laser processing applications, including laser heating, laser brazing, and laser welding. However, it has poor optical properties due to low laser energy absorption. However, this could be improved with the aid of laser surface modification (LSM). The significance of this work is to examine the influence of LSM laser power on the surface roughness of 316L stainless steel samples. First, the LSM laser power was varied from 15 to 27 W. Then, the surface topography and variation of the surface roughness values were examined by using a 3D optical microscope. Furthermore, the modified surface by LSM will be heated using laser radiation in order to analyze the effect of surface roughness towards laser heating temperature. The result revealed that as the LSM power increased, thereby resulting in an increase of surface roughness. The highest LSM laser power (27 W) produced the highest surface roughness with 28.98 μm . Experimental results illustrate that the heating temperature were increased 36%, corresponding to a polished flat reference surface, which indicates the increment in energy absorptivity.

KEYWORDS

Laser surface modification; Surface roughness; Stainless steel

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