

عنوان مقاله:

A Finite Element Simulation during Selective Laser Melting; Effect of Processing Parameters

محل انتشار:

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خلاصه مقاله:

Selective laser melting is a novel manufacturing process, in which a very high temperature gradient is occurred. Therefore, thermal simulations are necessary to predict the maximum temperature, thermal history, and melt pool dimensions. In this research, a 3D non-linear transient finite element model was developed to investigate the effect of processing parameters such as laser scan speed and laser power on maximum temperature and melt pool dimensions. The finite element model was adaptively remeshed at every increment and consequently, the computational time was increasingly reduced. Using the results of the finite element analysis, the maximum temperature and melt pool dimensions for different laser scan speed and laser power for Ti-6Al-4V were calculated. According to the results, the laser power effect on maximum temperature is more than that of laser scan speed. In addition, after a certain amount of increasing the volume energy density, the maximum temperature and melt pool dimensions will be less affected by further increasing the amount of volume energy density. Finally, the effect of processing parameters on depth of penetration was investigated and the optimum parameters for melting the total powder layer was reported.

کلمات کلیدی:

Finite Element Analysis, Selective Laser Melting, Simulation, Processing Parameters, Melt Pool

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