

### 论文摘要

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## 喷射沉积5A06铝合金楔压变形的数值模拟

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**摘 要:** 为优化楔压变形的工艺参数, 采用Deform-3D有限元软件对喷射沉积5A06铝合金楔压变形进行了数值模拟。压头压下速度为0.1~10 mm/s, 变形温度为350~550 °C。结果表明: 压下速度越大, 坯料的平均密度和变形抗力越高, 楔压表面质量越好, 不容易产生台阶, 但所需的压力机吨位也越大。变形温度对坯料的致密没有明显的影响, 然而温度太低容易在压制过程产生裂纹, 而温度过高时坯料表面容易出现畸变, 并且组织会发生过烧。因此, 喷射沉积5A06铝合金楔压变形的最佳工艺参数为: 压头压下速度1.0 mm/s, 变形温度为450 °C。

**关键字:** 5A06铝合金; 喷射沉积; 楔压; 数值模拟

## Numerical simulation on sequential motion compacting of spray deposited 5A06 aluminum alloy

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**Abstract:** In order to optimize the processing parameter, the sequential motion compacting of spray deposited 5A06 alloy was simulated by using rigid-plastic finite element method (FEM) on DEFORM-3D software. During the sequential motion compacting, the depressed velocity of head is 0.1–10 mm/s, the range of deformation temperature is 350–550 °C. The results show that with increasing depressed velocity, the average density of preform and resistance of deformation become higher, the surface quality becomes better and there are no steps on the surface, but the press tonnage also becomes higher. Although the effect of deformation temperature on densification of preform is obscure, when the temperature is too low, the cracks occur easily, and when the temperature is too high, the aberration appears easily on the surface, the overburning microstructure can be found at the meantime. Thus, the optimal processing parameters of sequential motion compaction for spray deposited 5A06 alloy are: depressed velocity of head of 1.0 mm/s, deformation temperature of 450 °C.

**Key words:** 5A06 alloy; spray deposition; sequential motion compacting; numerical simulation

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