

### 论文摘要

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## 喷射沉积高硅铝合金的半固态触变成形

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**摘要:** 研究了喷射沉积高硅铝合金在半固态触变成形过程中的规律。结果表明: 喷射沉积Al 20%Si, Al 30%Si, Al 30%Si 2%Ni, Al 30%Si 2%RE和Al 30%Si 2%Ni 2%RE具有良好的半固态触变成形性能; 半固态挤压压力比固态挤压压力明显降低, 喷射沉积快速凝固形成的细小硅相, 使其半固态浆料具有很好的流动性和充填性能, 半固态组织中未熔 $\alpha$ 使半固态坯料具有良好的形状保持性。触变成形后微观组织更加均匀, 致密度大幅度提高。

**关键字:** 喷射沉积; 高硅铝合金; 半固态触变成形

## Semi solid thixoforming of spray formed high silicon hypereutectic Al Si alloy

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**Abstract:** Thixoforming properties of spray formed high silicon hypereutectic Al Si alloys were studied. It is shown that spray formed Al 20%Si, Al 30%Si, Al 30%Si 2%RE and Al 30%Si 2%Ni 2%RE billets have good thixoforming properties. The semisolid extrusion force is remarkably decreased compared with the solid extrusion process, which is because of the existence of the fine silicon crystals and the spherical  $\alpha$  phases. Fine silicon crystals in microstructures of spray formed alloys make the semisolid slurry have good fluidity. The spherical  $\alpha$  phases existing in semisolid mushy make the semisolid billets have shape holding ability. The microstructures become more homogeneous and the densities increase notably after semisolid thixoforming.

**Key words:** spray form; hyper eutectic Al Si alloy; semi solid thixoforming

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