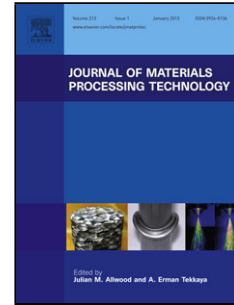


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Effects of Hollow Structures in Sand Mold Manufactured Using 3D Printing Technology

Chengyang DENG^a, Jinwu KANG^{a*}, Haolong SHANGGUAN^a, Yongyi HU^a, Tao HUANG^b, Zhiyong LIU^a

^aSchool of Materials Science and Engineering, Tsinghua University, Key Laboratory for Advanced Materials Processing Technology, Ministry of Education, Beijing 100084, China

^bBeijing DRUCK technology development Co. Ltd., Beijing 100084, China

*Correspondence author: kangjw@tsinghua.edu.cn

Abstract

The performance of 3D printed sand molds with internal hollow structures was studied. The influence of the internal hollow structures (a single layer air cavity or multilayer air cavities) on heat flux was theoretically analyzed and numerically simulated using COMSOL software. Better insulation effect was achieved by reducing the cavity spacing, and multilayer air cavities performed better than a single layer air cavity. 3D printed sand molds with these hollow structures for a stress-frame casting and a bar-shaped casting were designed and poured with aluminum alloy A356 melt. The solidification time of the riser surrounded by three layers of air cavities was prolonged by over

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