

Accepted Manuscript

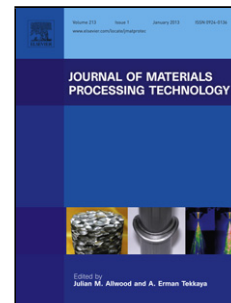
Title: Scaling laws for the additive manufacturing

Authors: Alexander M. Rubenchik, Wayne E. King, Sheldon Wu

PII: S0924-0136(18)30090-6
DOI: <https://doi.org/10.1016/j.jmatprotec.2018.02.034>
Reference: PROTEC 15661

To appear in: *Journal of Materials Processing Technology*

Received date: 8-10-2017
Revised date: 22-1-2018
Accepted date: 22-2-2018



Please cite this article as: Rubenchik AM, King WE, Wu S, Scaling laws for the additive manufacturing, *Journal of Materials Processing Technology* (2018), <https://doi.org/10.1016/j.jmatprotec.2018.02.034>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Scaling laws for the additive manufacturing

Alexander M. Rubenchik^{1*}, Wayne E. King², and Sheldon Wu¹

¹ NIF and Photon Science Directorate

² Physical and Life Sciences Directorate,

Lawrence Livermore National Laboratory, Livermore, CA 94550 USA

* Corresponding author. Tel.: +1-925-422-6131

Email address: rubenchik1@llnl.gov

Abstract. The evaluation of simple thermal model of selective laser melting (SLM) process shows that the temperature distribution in the sample is characterized by two dimensionless parameters: normalized enthalpy and the ratio of dwell time to the thermal diffusion time. We demonstrated that the melt depth data taken for different machines for different materials collapsed in one curve, making possible to rescale the optimal processing parameters between the different materials and machines. The melt pool depth, width and the length are the universal function of these two parameters. Within the operational range of parameters for SLM these functions

Download English Version:

<https://daneshyari.com/en/article/7176376>

Download Persian Version:

<https://daneshyari.com/article/7176376>

[Daneshyari.com](https://daneshyari.com)