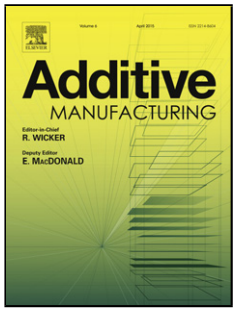

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PII: S2214-8604(16)30216-0
DOI: http://dx.doi.org/doi:10.1016/j.addma.2017.01.002
Reference: ADDMA 146

To appear in:

Received date: 2-9-2016
Revised date: 4-1-2017
Accepted date: 14-1-2017

Please cite this article as: Lourdes D.Bobbio, Shipin Qin, Alexander Dunbar, Panagiotis Michaleris, Allison M.Beese, Characterization of the strength of support structures used in powder bed fusion additive manufacturing of Ti-6Al-4V, http://dx.doi.org/10.1016/j.addma.2017.01.002

Characterization of the strength of support structures used in powder bed fusion additive manufacturing of Ti-6Al-4V

Lourdes D. Bobbio[1+], Shipin Qin[1+], Alexander Dunbar[2], Panagiotis Michaleris[3], Allison M. Beese[1*]

[1] Department of Materials Science and Engineering, Pennsylvania State University, University Park, PA 16802

[2] Department of Mechanical and Nuclear Engineering, Pennsylvania State University, University Park, PA 16802

[3] Autodesk, Inc., State College, PA 16803

[+] These authors contributed equally to this work

* Corresponding author's email: amb961@psu.edu

Abstract

Support structures are required in powder bed fusion (PBF) additive manufacturing of metallic components with overhanging structures in order to reinforce and anchor the part, preventing warping during fabrication. In this study, we fabricated and tested the tensile structural strength of support structures with four different 2-dimensional lattice geometries by fabricating samples composed of solid material on the bottom, followed by support material in the middle, followed by solid material on the top. The support structure regions were fabricated with a lower linear heat input than the solid material, providing deliberate geometrical stress concentrations to enable the removal of support material after processing. These samples were subjected to tension in the vertical direction to measure the strengths of the support structure-solid material