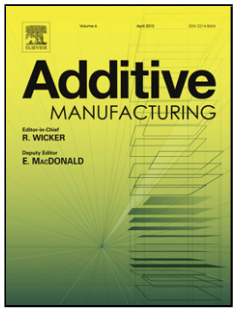

Title: Analysis of the material <!–<query id="Q1">Please check the DOC head for correctness.</query>–>properties involved in laser sintering of thermoplastic polyurethane

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PII: S2214-8604(16)30151-8
DOI: http://dx.doi.org/doi:10.1016/j.addma.2017.03.001
Reference: ADDMA 154

To appear in:

Received date: 28-6-2016
Revised date: 24-1-2017
Accepted date: 1-3-2017

Please cite this article as: {http://dx.doi.org/

<AT>Analysis of the material properties involved in laser sintering of Thermoplastic Polyurethane

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<ABS-Head><ABS-HEAD>Graphical abstract
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<ABS-P><xps:span class="xps_Image">fx1</xps:span>
<ABS-HEAD>Highlights► Four distinct TPU grades are analyzed for the use in laser sintering. ► Clear links between material properties and sintering behavior are established. ► Guidelines for future selection of TPU grades for laser sintering are deduced.
<H3>1.1.4 <ABS-HEAD>Abstract

<ABS-P>As laser sintering is increasingly being used for the production of actual end-use parts, there is considerable interest in developing materials that would enable new applications for this technique. Considering their properties and current applications, elastomeric polymers such as thermoplastic polyurethanes (TPU) have a very high potential in this regard. This study investigates the material properties that are involved in TPU sintering through the analysis of four distinct TPU grades. Examined parameters include powder flow, rheology of the melt and shrinkage and hardening behavior. It is found that, even though the particle morphology is not optimum, smooth and dense powder layers can be deposited for the investigated powders. Low melt viscosity and low shrinkage upon hardening further enable these materials to be easily processed into functional parts. Remaining issues, however, are part porosity and material degradation. The findings in this study provide clear links between material properties and behavior during laser sintering, and result in guidelines for future selection of TPU grades.
<KWD>Keywords: *Laser sintering*; *Elastomer*; *Thermoplastic Polyurethane*; *Thermal properties*

<H1>1. Introduction

Laser sintering (LS) is a form of additive manufacturing (AM) in which parts are built layer-by-layer, providing greater design freedom than conventional polymer processing methods such as injection molding [1,2]. The process consists of