

Accepted Manuscript

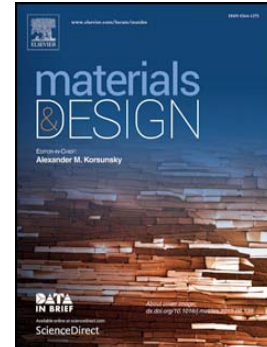
Review of in-situ process monitoring and in-situ metrology for metal additive manufacturing

Sarah K. Everton, Matthias Hirsch, Petros Stravroulakis, Richard K. Leach, Adam T. Clare

PII: S0264-1275(16)30099-5
DOI: doi: [10.1016/j.matdes.2016.01.099](https://doi.org/10.1016/j.matdes.2016.01.099)
Reference: JMADE 1300

To appear in:

Received date: 13 November 2015
Revised date: 20 January 2016
Accepted date: 21 January 2016



Please cite this article as: Sarah K. Everton, Matthias Hirsch, Petros Stravroulakis, Richard K. Leach, Adam T. Clare, Review of in-situ process monitoring and in-situ metrology for metal additive manufacturing, (2016), doi: [10.1016/j.matdes.2016.01.099](https://doi.org/10.1016/j.matdes.2016.01.099)

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.

Review of in-situ process monitoring and in-situ metrology for metal additive manufacturing

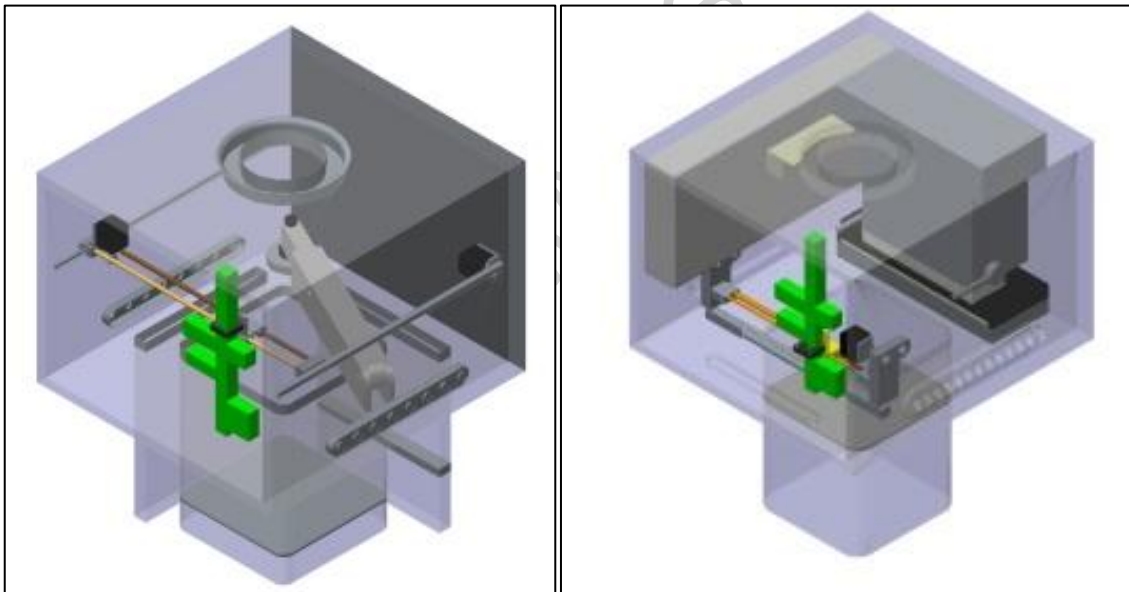
Sarah K. Everton^{a,b}, Matthias Hirsch^a, Petros Stravroulakis^a, Richard K. Leach^a, Adam T. Clare^a

a. Department of Mechanical, Materials and Manufacturing Engineering, University of Nottingham, University Park, Nottingham, NG72RD, United Kingdom.

b. Manufacturing Technology Centre, Ansty Park, Coventry, CV7 9JU, United Kingdom.

Contact mail: sarah.everton@nottingham.ac.uk

Graphical Abstract



Example concepts for integration of a sensor unit (green) for in-situ monitoring of laser powder bed fusion.

Highlights

- An overview of the state-of-the-art in the methods for assessing the performance of additive manufacturing processes is highlighted.
- The need for new sensors and monitoring methods for emergent additive manufacturing processes is introduced.
- Typical material discontinuities resulting from well understood processes are explored and the case for in-situ monitoring methods is made.
- The industrial opportunity for these advanced methods is explored alongside the new benefits for the metal based additive manufacturing techniques which will make use of monitoring methodologies.

Abstract

Lack of assurance of quality with additively manufactured (AM) parts is a key technological barrier that prevents manufacturers from adopting AM technologies, especially for high-value applications where component failure cannot be tolerated. Developments in process control have allowed significant enhancement of AM techniques and marked improvements in surface roughness and material properties, along with a reduction in inter-build variation and the occurrence of embedded material discontinuities. As a result, the exploitation of AM processes continues to accelerate. Unlike established subtractive processes, where in-process monitoring is now commonplace, factory-ready AM processes have not yet incorporated monitoring technologies that allow discontinuities to be detected in process. Researchers have investigated

Download English Version:

<https://daneshyari.com/en/article/7218494>

Download Persian Version:

<https://daneshyari.com/article/7218494>

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