European Journal of
Applied Engineering and Scientific Research

Abstract

An investigation into the effect of a recycling regime upon ELI Ti6Al4V (Grade 23) powder used within the selective laser melting (SLM) process

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Abstract:

Selective laser melting (SLM) provides the opportunity to design and manufacture components with high levels of geometric complexity, via the layer on layer build approach associated. A major advantage related to this additive manufacturing (AM) process, is the ability to recycle and reuse any exposed, unused powder during manufacturing. Improving the cost-effectiveness of the process. However, research suggests that throughout a recycle regime the powder characteristics can change. As a result, impacting upon the mechanical properties of the as-built components produced. This study will track ELI Ti6Al4V (Grade 23) powder across 8 recycles, analyzing the powder after each recycle phase. Providing a comprehensive analysis of the powder characteristics during recycling, to determine any indication of powder variation. Characterization will include chemical composition, sizing, bulk morphology and density analysis. Results show that there is a significant increase of Oxygen content (wt%). In addition, narrowing of the particle size distribution (PSD) is evident.

Biography:

Ryan Harkin, a 3rd year PhD researcher at the University of Ulster, Magee campus. My research is focused on ELI Ti6Al4V processed by the powder bed fusion process. Primarily powder recycling analysis and the impact upon as-built component properties.

Publication of speakers:

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2. Ryan Harkin; et al. J Diabetes Sci Technol. 2016 Jan; 10(1): 191–229. Published online 2015 Dec 22.
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5. V. Commissariat Am Psychol. Author manuscript; available in PMC 2018 Jan 31. Published in final edited form as: Am Psychol. 2016 Oct; 71(7): 539–551.

3rd International Conference on 3D Printing and Additive manufacturing; May 22-23, 2020; Paris, France

Citation: Ryan Harkin, An investigation into the effect of a recycling regime upon ELI Ti6Al4V (Grade 23) powder used within the selective laser melting (SLM) process ; May 22-23, 2020; Paris, France.