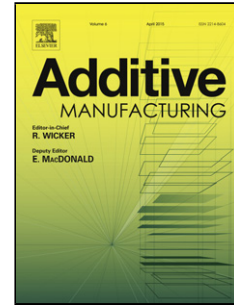


Accepted Manuscript

Title: Silica coated titanium using Laser Engineered Net Shaping for enhanced wear resistance

Authors: Bryan Heer, Amit Bandyopadhyay

PII: S2214-8604(18)30338-5
DOI: <https://doi.org/10.1016/j.addma.2018.08.022>
Reference: ADDMA 480



To appear in:

Received date: 17-5-2018
Revised date: 14-8-2018
Accepted date: 15-8-2018

Please cite this article as: Heer B, Bandyopadhyay A, Silica coated titanium using Laser Engineered Net Shaping for enhanced wear resistance, *Additive Manufacturing* (2018), <https://doi.org/10.1016/j.addma.2018.08.022>

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Silica coated titanium using Laser Engineered Net Shaping for enhanced wear resistance

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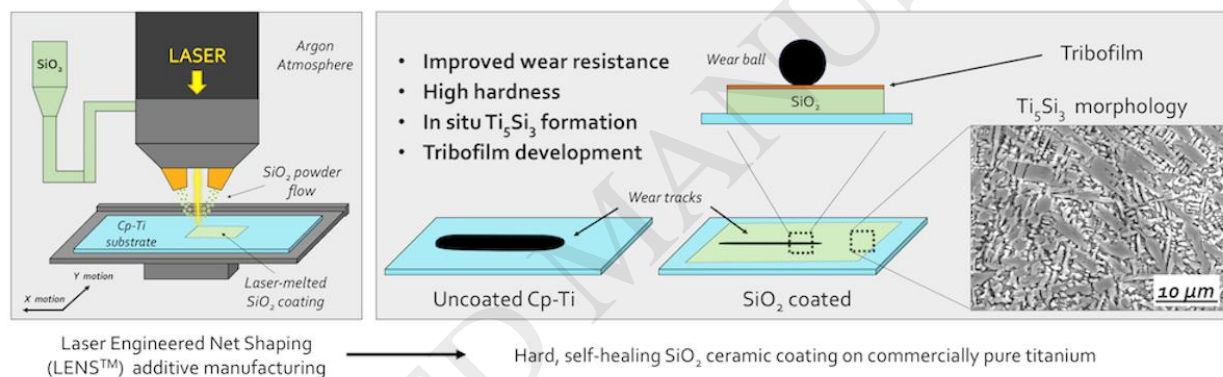
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Graphical abstract



Abstract

Laser Engineered Net Shaping (LENSTM) was utilized to create novel silica (SiO_2) coatings onto commercially-pure titanium (Cp-Ti). It was hypothesized that if silica could be deposited as a coating via laser surface engineering, high hardness and wear resistance could be added to existing Cp-Ti material. Post-deposition heat-treatments in the form of laser passes (LP) and a furnace residual stress-relief were completed on the coatings and mechanical/material properties were subsequently evaluated. Titanium silicide (Ti_5Si_3) formation and related dendritic microstructures were identified throughout the coating by x-ray diffraction (XRD), energy dispersive spectroscopy (EDS), scanning electron microscopic (SEM) analysis, and

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