



Lasers in Manufacturing Conference 2021

## Polymer powders with enhanced absorption in the NIR for laser powder bed fusion with diode lasers

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### Abstract

Additive manufacturing techniques represent an ideal manufacturing process for series components, for example in the automotive industry when good mechanical properties and precision are needed. In that sense, Laser Powder Bed Fusion (LPBF) is a manufacturing technique already employed in several applications where polymer parts with complex geometries are required. However, since the employed polymer powders exhibit a low absorption in the visible and NIR wavelength range, the laser sources employed in polymer LPBF are limited.

To address this difficulty, the addition of near-infrared absorbing LaB6 nanoparticles is proposed and tested on the most employed polymer powder for LPBF, i.e. polyamide 12 (PA12). The nanoparticles are generated by laser ablation in liquid and homogeneously dispersed on the polymer surface by dielectrophoretic deposition. The resulting nanoadditivated polymer powder exhibits an absorption maximum at 800 nm, suitable for its processability by LPBF with NIR laser sources.

Keywords: Laser powder bed fusion; nanoparticles; near-infrared absorption

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