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Customized biomedical parts with Lithography-based Metal Manufacturing

Lithography-Based Metal Manufacturing (LMM) is emerging as an advanced additive manufacturing (AM) technology designed for the production of functional and intricate metal components with fine details, superior surface aesthetics, and heightened feature resolutions compared to alternative AM methodologies. LMM employs photopolymerization principles in metal manufacturing, where metal powder is uniformly dispersed within a light-sensitive resin, forming a three-dimensional structure through layer-by-layer exposure to light.
The printed components undergo a subsequent debinding and sintering process, akin to other sinter-based metal manufacturing technologies. Following these steps, mechanical properties comparable to those achieved through Metal Injection Molding (MIM) can be realized. Additionally, the as-sintered parts exhibit surface roughness (Ra) values below 2 µm, highlighting the method's ability to produce high-quality surfaces without extensive post-processing.
The flexibility in design inherent to LMM allows for the fabrication of complex and customized geometries, making it a viable method for producing patient-specific medical devices and components.
In this talk, we examine recent developments in applying LMM in the biomedical field, with a focus on surgical instrumentation and the development status of grade 5 Ti6Al4V using this sinter-based technology. Furthermore, we discuss how LMM's capability to produce lightweight, biocompatible metal parts broadens its application in medical technologies, offering new avenues for innovation in personalized healthcare solutions.