

Advantages of Additive Manufacturing to Precious Metals Applications

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Abstract:

As we still learn about pros and cons of the emerging technology of additive manufacturing, especially in the case of precious metals with its long history rich in tradition, handcraft, artisanry, emotion and value. The potential of the combination of additive manufacturing and precious metals might be different to non-precious metal processing and therefore not obvious at a first glance. Considering the significance of freedom of design, economical aspects and variety of materials our experience shows that additive manufacturing is of great importance particularly for precious metals applications.

This paper gives an insight into the processing of precious metals powders by laser fusion. Selected applications show the particular advantages of additive manufacturing of precious metals covering unique jewelry design possibilities, efficient production with regard to lot size and material input as well as unleashing materials and their special properties unthinkable in the world of casting metallurgy. And it is not all about jewelry and luxury goods. Think of properties like high resistance to temperature and/or corrosion as well as biocompatibility and you end up with new opportunities for technical or medical applications.

Introduction:

Precious metals represent a small group of materials with outstanding properties. The use of noble elements like gold and platinum is the first choice when it comes to properties like biocompatibility, technical extraordinariness like corrosion resistance and conductivity or more emotional features like color and feel. The jewelry and watch industry is obvious a market for precious metals whereas noble metal alloys are often hidden champions in med-tech and industrial applications such as micro components for cardiac pacemakers, spark plugs, flowmeters and sensors.

With regard to economic properties, precious metals are among the most expensive engineering materials. Prices for the raw materials are usually taken into consideration in calculations by Euros per gram and add