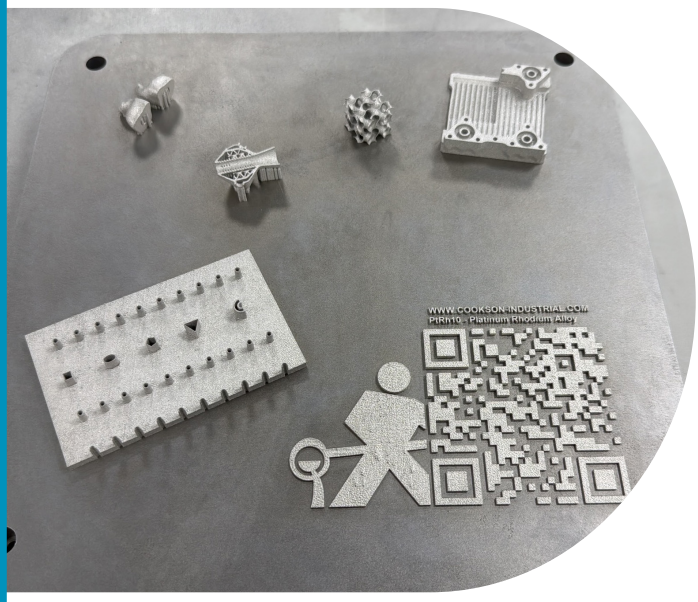
3 SEPTEMBER 2025

Platinum rhodium industrial components produced using 3D printing. Picture credit: Renishaw



ADDITIVE MANUFACTURING WITH PLATINUM

The use of PGMs in speciality powders for 3D printing continues to evolve

Additive manufacturing, also known as 3D printing, is a process that creates objects by adding material layer by layer from a digital design, contrasting with traditional subtractive methods like machining. It has revolutionised the production of high-performance components across various sectors, including aerospace, automotive, energy and medicine. This transformative technology enables the production of different shapes, reduces material waste and allows faster and more cost-effective prototyping with reduced lead times. It has also led to the development of highly-optimised materials, including speciality powders.

It is over a decade since Japan's Tanaka Precious Metals developed the world's first platinum-based powder for 3D printers. Enabling platinum-based materials to be produced using 3D printers made it possible to form them into complex shapes, harnessing platinum's excellent corrosion resistance and exceptional strength at extremely high temperatures to manufacture entirely new types of products.

Today, the additive manufacturing of platinum group metal (PGM) speciality metal powders is of increasing interest in the aerospace industry. According to Johnson Matthey, the next generation of satellite thrusters is expected to be made this way, providing longer lifetimes, reduced intrinsic metal content and greater freedom of design.

On demand printing

Further, high-temperature, corrosion-resistant parts, for industries like glass fibre manufacturing, can be viably manufactured with additive manufacturing and PGM powders due to technological advancements that are minimising material waste. Meanwhile, 3D printing brings benefits in terms of reducing inventory. Instead of procuring hundreds of units of an item, then warehousing, securing, tracking and insuring them, additive manufacturing requires the storage of only a range of powders, which can be printed on demand.

A Renishaw 3D printer model. Picture credit: Renishaw

While 3D printing is a maturing technology for the wider jewellery industry, last year saw the commercial launch of the first platinum-based jewellery to showcase the potential for 3D printed platinum in the sphere of jewellery design and fabrication. The 30-piece Tùsaire Collection – named after the Scottish Gaelic word for pioneer –comprised platinum and titanium torc necklaces with interchangeable elements such as cuffs, rings and earrings.

Commenting at the time, Tai Wong, Global Director of Innovation at Platinum Guild International who collaborated on the launch, said:

"We really wanted to put 3D printing of platinum to the test, to identify advantages and challenges, in the hope of expediting the technology's application to jewellery to create novel designs and experiences. There is no doubt additive manufacturing will be very important for the future of jewellery as it unlocks many new possibilities."

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