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# Metalysis Doubles Gen 2 R&D Demonstration Units:

## Expansion Accelerates Growing Customer Demand for Novel Advanced Materials produced by a Western Midstream Manufacturer

*UK-based Metalysis doubles its Gen 2 demonstration units, increasing capacity to support customer R&D serving specialist markets. Gen 2 units enable transition from grams (Gen 1) to kilograms-scale output using the patented Metalysis FFC Cambridge process.*

*Each Gen 1–4 stage represents a scaling of Metalysis' electrochemical technology.*

*Expansion driven by demand for Western critical mineral midstream assets, amid growing pressure to reduce reliance on Chinese supply chains.*

Metalysis, the end-to-end manufacturer of solid-state metal and alloy powders and global leader in materials science, has doubled its Gen 2 demonstration units to meet unprecedented demand from advanced industries, including electronics, hypersonics, defence, clean energy and space. This expansion supports customers developing next-generation materials and reflects heightened urgency to secure non-Chinese midstream processing options following ongoing uncertainties surrounding new Chinese export controls on critical minerals and rare earth elements, first enacted in April.

At the heart of Metalysis's capability is the patented Metalysis FFC Cambridge electrolysis process, which reduces metal oxides to pure metal or alloy powders in the solid state, using a calcium chloride electrolyte at moderate temperatures, between 650-950 degrees Celsius. The metal oxide acts as the cathode, and when a voltage is applied between it and the anode, which is typically carbon, oxygen is released from the metal oxide. The oxygen moves toward the anode, leaving a porous metal structure, or metal sponge. The sponge is then crushed,

milled, and dried to create a powder. Variations in the anode material are possible depending on the off-gassing being produced.

Unlike traditional high-temperature melting, this process consumes less energy, avoids hazardous chemicals, and enables precise control over material chemical and physical properties. Unlike multi-stage methods, such as those used in titanium alloy production, the Metalysis process is single-stage, resulting in higher yields, improved efficiency, and a more sustainable manufacturing footprint.

The process is agnostic to oxide composition. As a result, the Gen units are not constrained by product type, allowing Metalysis to support a wide variety of customer applications using the same core technology.

The Gen system provides a scalable platform, from gram-scale R&D (Gen 1) to kilogram-scale demonstration (Gen 2), commercial (Gen 3), and industrial-scale (Gen 4) production. The new Gen 2 units are housed at the Metalysis Discovery Centre in South Yorkshire, supporting customers as they scale up production and validate material performance.

In addition to its environmental benefits, the Metalysis process is highly adaptable. It allows for the production of bespoke materials tailored to specific customer requirements. This capability to create unique physical and chemical attributes has seen Metalysis emerge as a global partner to the advanced electronics sectors - semiconductors and capacitors - as well as clean energy, aerospace, hypersonics, space and other advanced manufacturing verticals which require specific novel and innovative materials. These are applications where traditional manufacturers struggle with due to inherent limitations in their production processes.

Since 2019, Metalysis has emerged as a global leader in In-Situ Resource Utilisation (ISRU), so enabling space exploration. The company has developed methods to extract oxygen from lunar regolith using its electrolysis process in partnership with the European Space Agency and the UK Space Agency. By employing an oxygen-evolving anode instead of a conventional carbon anode, the process releases oxygen, which can be captured, and when utilised in situ on the lunar surface, can provide oxygen for propulsion and life support. Discussions with national and commercial partners are underway to advance a Gen 2 deployment on the lunar surface.

The strategic importance of Metalysis's capabilities has grown in light of recent and ongoing Chinese export controls on rare earth elements and critical minerals. These events have

highlighted the use of essential minerals as tools in geopolitical and geoeconomic tensions. China continues to dominate mining and midstream processing, with 90 per cent of global midstream capacity. To reduce this dependency, Western nations are urgently seeking alternative processing solutions. Metalysis is well-positioned to fill this gap, offering scalable midstream capability across a wide range of critical materials.

**Nitesh Shah, CEO of Metalysis:** *"We are delighted to be doubling our Gen 2 units, just 7 months after we increased our Gen 1 capacity by 1/3. We are seeing increasing demand for our products at the Gen 2 level, sending material to clients for evaluation and qualification into specialist markets, with particular interest from sputtering target manufacturers. A range of advanced manufacturing sectors come to Metalysis because of our core suite of products - capacitor grade tantalum, scandium tri-aluminide (Al3Sc), niobium alloys and our ability to create lightweight refractory high entropy alloys, and because clients know that with all the materials that we produce we bring unique and bespoke physical and chemical attributes to the end-material, meaning we are without competition across a range of products. The recent REE controls by the Chinese have accelerated this process as clients require metal feedstocks and midstream processing from outside of China, and this will be the dominant trend across critical materials over the next few years".*

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Notes to editors

Metalysis is a global leader in producing metal powders, alloy powders and high entropy powders for use in advanced electronics including semiconductors and capacitors, defence, hypersonics, engineering and construction, aerospace, clean energy, electric vehicles, AI, 5G and the IoTs. Deploying our patented FFC solid-state electrolysis process we can reduce

metal oxides from 49 elements of the periodic table creating valuable metal, metal alloy and high entropy alloy powders.

Since 2019, Metalysis has emerged as the global leader in space exploration, having partnered with the European Space Agency and the UK's space agency to extract oxygen from lunar regolith. Metalysis was approached because the electrolysis process liberates oxygen from metal oxides. Employing an oxygen-evolving anode versus the conventional carbon, means that oxygen is the released gas – which can be captured, and when utilised in-situ on the lunar surface, can provide oxygen for propulsion and life support. The European Space Agency is developing the Metalysis FFC Cambridge process at Gen 1 scale – whilst Metalysis is in conversations with commercial partners to accelerate the deployment of a Gen 2 on the lunar surface.

Metalysis is a key-midstream asset for the UK and Her allies – providing domestic oxide reduction capabilities within the UK meaning critical materials and rare earth elements are not exposed to supply chain risks.

For more information

www.metalysis.com

https://www.linkedin.com/company/metalysis