

Metalysis Ltd.

Production of Niobium Containing High Entropy Alloy

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HIGHLIGHTS

- Metalysis Ltd. has produced a Niobium containing High Entropy Alloy (HEA) via its patented Metalysis Process;
- The Metalysis Process is theoretically capable of producing the Niobium containing HEA, among others, at industrial scale;
- It is the latest achievement to utilise Metalysis’ patented, scalable solid state technology to produce high demand and brand new metal powder products; and
- Ongoing efforts weighing commercial applications across a range of producible HEAs and metal powders, as the ‘Gen 4’ project heads towards commissioning; proving the next step in Metalysis’ roadmap for scalability of technology.

Metalysis Ltd. (“Metalysis” or “the Company”), the innovative South Yorkshire-headquartered company focused on commercialising its proprietary solid state metal powder manufacturing technology, announces the production of a Niobium containing High Entropy Alloy (“HEA”).

HEAs are metastable materials which involve the combination of five or more metals from the periodic table. Niobium containing HEAs, being refractory, are particularly applicable to high temperature applications. These include future applications within the aerospace and gas turbine markets, among other industries.

Table 3

ELEMENT	Ta				ELEMENT	Nb	Cr	Ti	Al
Nb	540	Nb			Ta	6.4	8.7	10.9	12.6
Cr	1100	570	Cr		Nb	2.3	4.5	6.2	
Ti	1349	809	239	Ti		Cr	2.2	3.9	
Al	2357	1817	1247	1008			Ti	1.7	

Melting point differences (°C)

Table 3b densities differences (g/cm³)

Properties of alloying elements for the AlTiCrNbTa HEA

Metalysis successfully produced the Niobium containing HEA at its industrial scale facility in Wath-Upon-Dearne, which today produces Titanium and Tantalum metal powders, predominantly for 3D Printing. The production of innovative alloy powders represents a significant focus for Metalysis’ research and development function.

While numerous materials scientists have focused their attentions on the creation, testing and improvement on Niobium based HEAs, the Metalysis Process has done so uniquely. The Company’s technology is capable of combining elements of dissimilar melting points, as is clearly illustrated for Aluminium and Tantalum in Table 3. This is difficult to replicate conventionally and therefore underpins the uniqueness and complexity of the Niobium containing HEA produced, as does the Metalysis Process’s ability to combine mismatched densities.

Metalysis' "powder in, powder out" proven electrolytic technology can produce many periodic table elements and alloys, and also entirely new alloys. The Company's 'Generation 4' ("Gen 4") cell is under construction, with commissioning targeted for Q2 2017.

Gen 4, and subsequently 'Gen 5', will prove that the Company's modular technology can be scaled up to meet a given industrial requirement and offer highly profitable, niche multi-metal powder production at lower cost and less environmental impact compared to traditional production methods. This will include proving to industrial scale the production of the Niobium containing HEA announced today.

Dr. Dion Vaughan, Chief Executive Officer of Metalysis, said:

"Producing a Niobium containing HEA using our patented process marks the latest in our line of exciting achievements for Metalysis. Doing so further illustrates the wide range of products our technology can deliver, and marks theoretical means to produce a Niobium containing HEA at industrial scale. Pushing the boundaries of traditional alloys production remains a stated aim for Metalysis.

"In the coming months, our Gen 4 project will play an important part in scaling up the Titanium and Tantalum metal powders we commercially produce today, primarily for the 3D printing industry, as well as proving that we can produce at industrial scale a range of unique alloys, including a Niobium containing HEA; all at comparably lower cost and lesser environmental footprint."

Metalysis will attend The 2016 Materials Research Society (MRS) Fall Meeting & Exhibit in Boston, Massachusetts, held 27 November – 02 December. A technical paper titled, *Solid State Manufacturing of High Entropy Alloys* will be submitted and made available to attendees.

To learn more about Metalysis, please visit company representatives at the conference, or use the contact information provided below.

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Notes to Editors

Metalysis Ltd. is a growing company with global rights to a disruptive solid state metal powder manufacturing technology; a low-cost and environmentally friendly process over traditional metal production methods.

The Company is committed to transforming the metals industry through the commercial exploitation of our patented process for producing Titanium, Tantalum, other metals and innovative alloy powders.

Based in South Yorkshire, Metalysis benefits from a highly supportive shareholder base which includes Iluka Resources, Woodford Funds and BHP Billiton. This has enabled the Company to raise substantial funds, including £22 m in CY2016 to increase productivity and carry out its Generation 4 ("Gen 4") expansion. Being modular, Gen 4 has the potential be scaled up to provide hundreds of tonnes per annum of valuable speciality metal alloy powders.

Metalysis achieved its Investor in People accreditation in 2015.