SINTERING PROJECT RECEIVES TRANSFORMING FOUNDATION INDUSTRIES FUNDING

Lucideon, along with consortium partners including Vesuvius UK Ltd, Glass Technology Services Ltd, the University of Sheffield and Knowles (UK) Limited is receiving funding as part of the Transforming Foundation Industries programme for the ‘Hybrid Sintering for Decarbonisation and Productivity in Manufacturing’ project.

The funding is provided through the Government’s modern industrial strategy by UK Research and Innovation. The Transforming Foundation Industries (TFI) programme helps energy-intensive businesses to share expertise and come up with radical new innovations to help reduce their carbon footprint. The consortium is one of the first ten winners of the Fast Start Projects competition.

The hybrid sintering project will assess the possibility of combining two novel and highly energy efficient sintering technologies, namely flash sintering and cold sintering, to exploit the strengths of both systems, with the objective of developing a processing technology for use by the glass and ceramics sectors that offers benefits in resource and energy efficiency.

David Pearmain, head of Flash Sintering at Lucideon, said: “UKRI support is enabling us to evaluate an exciting new technology. Resource efficient production is of great interest to both the ceramic and glass sectors. This ground-breaking project is looking to combine two novel sintering technologies to significantly reduce both process time and energy consumption.”

www.lucideon.com/flash

INTRO FROM MARK DUDSON
BUSINESS MANAGER

Welcome to our final newsletter of 2020.

While this year has certainly been unprecedented and unsettling for everyone, we’ve continued to help our customers around the world with their materials and process challenges.

In this newsletter you’ll find details of a number of publicly-funded projects that we’ve won, alongside, of course, our consortium partners. These include working with: the National Nuclear Laboratory (NNL) Advanced Fuels Cycle Programme (AFCP) as a research & development partner; I3D Robotics Ltd and Glass Technology Services Ltd on the IRIFIO project; the STFC Hartree Centre to accelerate the development of novel ceramics; and Vesuvius UK Ltd, Glass Technology Services Ltd, the University of Sheffield and Knowles (UK) Limited on a Transforming Foundation Industries project.

Our own research projects have also continued. On page 2 you can read about how one of these projects found success when we used our proprietary geopolymer technology platform to manufacture blocks for use in construction.

We continue to invest in people and are pleased to have welcomed 14 new colleagues in the UK alone. Meet two of these on page 4.

Like many of you, we were disappointed that many of the conferences and exhibitions that we usually attend were cancelled or postponed. We took the opportunity though to engage in virtual events, such as Ceramics Expo Connect. We’re looking forward to the Ceramics UK digital event that is taking place on 4 December.

Finally, in early 2021 we will be inviting you to join the MaterialsMatrix, an online community for anyone interested in materials. It’ll be a place to network, discuss, learn, research and collaborate and, although a team at Lucideon has set up the platform, we want it to be developed by the community. We’ll be sending out details on how you can get involved shortly.

As ever, if there are any product or process challenges that we can help you with, do get in touch.

Wishing you, your family and colleagues a safe and healthy festive season.
Andy Perry, our Group Ceramic Processes Leader, recently wrote an article for Ceramic & Glass Manufacturing, an ACerS (American Ceramic Society) publication. In the article he looks at how the technical ceramics industry might take up lessons learned in the more traditional, clay-based sectors in order to solve processing challenges.

For all production processes, the classic areas where problems can be introduced are man, material, machine, and process. Slight variations in each of these areas, and in the combination of these areas, can have a profound effect.

Andy believes that while traditional ceramics manufacturers still have a lot to learn with regard to the correct testing regimes and interpretation of the associated data, in order to optimize processing times and yield, the technical side of the industry could learn a lot from them. Rather than relying on material purity and consistency, more selective and relevant testing could help them to understand the interaction of variation from each stage through the process, and each input variable.

You can read the full article on our website:
lucideon.com/processing-article

Lucideon has announced that it is working with the Science and Technology Facilities Council (STFC) Hartree Centre to explore the accelerated discovery and development of novel ceramics through computer modelling.

The project, part-funded by STFC's Bridging for Innovators (B4I) programme with in-kind funding by Lucideon, will assess the potential to significantly accelerate the product development cycle of novel ceramics by reducing the time and the amount of experimental work involved.

Building on advanced computer modelling and data analysis techniques, Lucideon will combine its many years of developing ceramic systems with the STFC Hartree Centre’s expertise in data science, computational materials science and atomistic modelling.

Stuart MacLachlan, Head of R&D at Lucideon said: “Companies are looking for components to work in increasingly harsh environments, but the development of new materials and associated processes to meet these demands is complex and often takes many years. This initiative will assess ways of accelerating the process and should form the basis of offering a design service for ceramic materials discovery.”

Dr Richard White, Principal Materials Consultant at Lucideon and leader of the project, said: “Experiments are essential to discovering new materials but they require a balance between numerous opposing constraints that evolve over multiple time and length scales. This can be like searching for a four-leaf clover in a meadow. We are using computational tools to help us search the meadow and then using the experimental capabilities at Lucideon to confirm that we have found one.”

Dr. Viktor Zolyomi, Computational Scientist at the STFC Hartree Centre said: “The ceramic discovery challenge posed by Lucideon is tailor-made for a computational approach that can leverage the Hartree Centre’s high performance computing architectures along with our expertise in atomistic modelling and data science techniques. At the same time, the sheer complexity of the challenge means that the high performance modelling will truly benefit from experimental input from Lucideon in order to perform any necessary course corrections as we navigate the treacherous seas of computational materials discovery.”

The collaboration between Lucideon and Hartree Centre will help to find unique materials that may not exist today and support their scale up for a range of urgent applications across multiple industries.
£350,000 PROJECT STARTS LUCIDEON AND NNL’S KEY PARTNERING AGREEMENT FOR ADVANCED NUCLEAR FUEL CYCLE RESEARCH

Lucideon’s pioneering work in the nuclear sector has taken a significant step forward under a new partnership arrangement.

The international materials technology company has signed a partner agreement with the UK’s National Nuclear Laboratory (NNL) Advanced Fuels Cycle Programme (AFCP) as a research and development (R&D) partner. The AFCP is part of the UK Government’s £180m Nuclear Innovation Programme, and is focused on the development of skills, knowledge and capabilities in the areas of advanced recycle and waste management and advanced nuclear fuels. The agreement involves an initial programme worth over £350,000 to Lucideon.

NNL will draw on Lucideon’s expertise in its Flash (field enhanced) Sintering technology to significantly improve the production of advanced nuclear fuels, through new developments in the structure and performance of materials.

Lucideon has made a multi-million investment in Flash Sintering technology – which centres around an electric field being applied to a ceramic at specific temperatures – at its Stoke-on-Trent, UK headquarters. The partner agreement will also see Lucideon collaborate with the University of Manchester, who will provide specialist resources to support the development.

Lucideon has carved out a niche as experts in the nuclear industry, in areas including the development of novel materials and processes, materials analysis, complex testing and additive manufacturing. The AFCP programme focuses on the development of new technologies and processes, which can contribute towards a reduction in the whole lifecycle costs of nuclear energy.

It also aims to ensure international co-operation, with an emphasis on promoting and maintaining the role of the UK as a global leader in these areas.

Technology areas include the development of accident tolerant fuels, fast reactor fuels, nuclear data development, separations technology, modelling and fabrication.

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LUCIDEON TO WORK ON IRIFIO PROJECT

Lucideon, along with consortium partners, I3D Robotics Ltd and Glass Technology Services Ltd, is to receive funding as part of UKRI’s Transforming Foundation Industries programme for the IRIFIO, Intelligent Robotic Inspection for Foundation Industry Optimisation, project.

The funding is provided through the Government’s modern industrial strategy by UK Research and Innovation. The Transforming Foundation Industries (TFI) programme helps energy-intensive businesses to share expertise and come up with radical new innovations to help reduce their carbon footprint. The consortium is one of the first ten winners of the Fast Start Projects competition.

The IRIFIO project will look at how machine learning can be utilized to enhance artificial intelligence, robotics and vision systems when applied to foundation industry production processes. It builds on previous work inspecting defects in metals production through digitized inspection sensor technology to enhance industrial productivity and significantly reduce energy in both glass and ceramic manufacturing.

Stuart MacLachlan, head of R&D at Lucideon, said: “We’re very excited to be involved with this project to develop I3D Robotics’ technology for better control of ceramic processes and product quality, which will be of great benefit to manufacturers.”

Have you heard about...

MICG
Midlands Industrial Ceramics Group

Comprising blue chip companies and SMEs including Rolls-Royce, JCB, Morgan Advanced Materials and Lucideon – as well as the universities of Birmingham, Leicester and Loughborough, the Midlands Industrial Ceramics Group (MICG) has been established to ensure advanced ceramics help drive the competitiveness and success of Midlands advanced manufacturing by tackling key innovation challenges.

The group has recently won Government funding provided through UK Research and Innovation’s flagship ‘Strength in Places Fund’ which will help unlock plans to put the Midlands on a unique footing as a global centre for advanced technical ceramics.

Find out more at www.micg.org.uk

Stuart MacLachlan
GEOPOLYMER BLOCKS PROJECT – A SUCCESS!

Lucideon’s proprietary geopolymer technology platform uses a low temperature reaction to consolidate processed natural materials or industrial by-products to form a robust body with strength and chemical stability.

The successful project looked at how the platform technology could be used to manufacture blocks from calcined clays and/or wastes from other industries such as metallurgical slags and coal fly ash. The resulting geopolymer blocks have many benefits over traditional cement blocks, including:

- Low environmental impact - up to 80% less CO₂ gas emissions during manufacture than Portland cement blocks
- Flexible formulations - they can be optimized to use locally sourced raw materials, reducing transportation cost and environmental impact
- Outstanding fire resistance - geopolymer blocks can withstand over 10 hours of fire exposure
- Exceptional thermal and sound insulation
- Great versatility - blocks can be produced in multiple dimensions

Geopolymer blocks can now be used for the construction of residential, commercial and industrial buildings, from the foundations through to the roof. Meeting our own exacting quality standards, as well as those of Building Regulations, the blocks can be used for internal partition, solid, cavity and separating walls as well as for cavity and solid foundations and suspended floors.

To discuss licensing options, contact Stuart MacLachlan, Head of R&D...

stuart.maclachlan@lucideon.com

Ceramic Additive Manufacturing Whitepaper Launched

The National Centre for Additive Manufacturing, working in collaboration with Lucideon, has created a whitepaper which defines a route for the UK to create a globally competitive supply chain to service the growing ceramic AM market. The paper, written by Dr Tom Wasley, who has been leading NCAM’s ceramic AM capability development, industrial engagement and project delivery, identifies key challenges facing the industry, and offers a number of development areas and opportunities for investment to position the UK at the forefront of this emerging technology.

To download visit www.lucideon.com/ceramic-am-wp

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NEW STARTERS

Dr David Barrientos

David has joined us as Nuclear Technical Sales Consultant. With a background as a nuclear fuels engineer he understands the technical challenges the nuclear industry faces. In particular, David has great experience in various areas such as detrimental materials, stress corrosion cracking and commercial grade dedications for nuclear fuels operations.

David is helping our nuclear clients in the Americas to solve existing and new challenges.

Viktorija Lapinska

Vikorija is studying Biomaterials at Queen Mary University of London and joins us for her placement year in industry. Her main responsibility at Lucideon will be working on the iCRT platform that Lucideon has developed. Vikorija’s third year project at university looked at encapsulation of low-molecular weight and high-molecular weight substances inside of microchambers to study their release, something that fits well with her role at Lucideon!

WE’RE RECRUITING!

The AMP division is looking for a Business Development Manager. If you have a scientific background, combined with a broad spectrum of sales and business development skills that can be applied across different technical sectors, then check out the vacancy at www.lucideon.com/careers