



September 2021

In the third newsletter 2021, we focus on development. Development in a collaborative project with the National Composites Center (NCC). The development of our board through the addition of two new board members. And how Nexam, as well as the industry, develop by taking on university students. We wish you a pleasant reading about this and more!

WORDS OF OUR CEO

Collaboration fosters development



”Collaboration fosters development – when disciplines, industries and contexts come together.”

After a summer in which both the pandemic's decline and the nice weather allowed for quality time with loved ones, we are once again heading into autumn. This year, with a sense of relief and hope as vaccination rates increase and infection rates decrease.

We are also approaching the end of the third quarter, a quarter that in most industrial companies is the most challenging. The holiday weeks reduce production time, and this year many businesses will also be affected by the aftermath of the pandemic in the terms of component and raw material shortages, as well as the global shipping crisis.

One of our main areas of focus right now is to develop and refine both new and old platforms. A natural focus area is our product group in recycling, given both market demand and the industry's need for a circular transformation. You can read more about this under the heading Market Focus.

In one of the other newsletter articles, we report on a recent collaboration with the UK's National Composites Centre (NCC). Following a three-year joint research project, Nexam has now entered a long-term collaboration with NCC, a research and development partner aimed at helping companies make lighter, stronger, smarter, and more sustainable materials. This is a good example of a partnership that is valuable in our continued development work to come up with new innovations.

Nexam has reached a size, scope and volume in its product offering where it will be important to further develop our development efforts. We will create and maintain an infrastructure around the company consisting of existing customers, other development companies and academia. All to ensure an outlook towards entirely new platforms and customers.

Our now broad product portfolio requires a more specific management of the development efforts, and we are currently working hard to create an infrastructure that will enable the delivery of new solutions to new customers, and to find completely new areas and platforms.

In a wider context, academia is an important part for development companies. It provides the industry with new knowledge but also with skilled manpower. To make it easier for students to get to know our particular niche in the industry, we think it's important to take on students who, for example, write their theses with us. We give our time and knowledge, and in return, we get a strengthened employer brand, new ambassadors, and potential new employees. In this newsletter, you can read about Erik Sjöberg, who got the opportunity to write his thesis with us.



To move forward in our quest to make plastics a material for the future and truly contribute to a more circular industry, we need broad collaborations and open minds. Collaboration fosters development – when disciplines, industries and contexts come together. I wish you a pleasant read!

Johan Arvidsson,
CEO, Nexam Chemical



RAW MATERIAL DAY

Raw Material Day with a Focus on Sustainable Solutions

During Raw Material Day, some 50 participants from the Danish polymer industry, universities and government agencies gathered to discuss and learn more about recycled and bio-based materials. Nexam Chemical was invited as one of the speakers for a presentation on [Reactive Recycling](#).



“For us in the industry, this was an opportunity to share experiences and make new business contacts to continue building sustainable plastics...”

In mid-September, Raw Material Day was held in Fredericia, Denmark, with a focus on manufacturer's demand for sustainable raw materials and plastics with low environmental impact.

Over the course of a day, participants learned about the rules and regulations that apply to recycled plastics, the latest developments in life cycle analysis and new developments in the field of bio-based plastic materials. Lars Öhrn, Chief Marketing Officer at Nexam Chemical, explained how Nexam's [Reactive Recycling](#) products improve recycled plastic materials, so that they regain their original properties and can be adapted to the application in which they will be used.

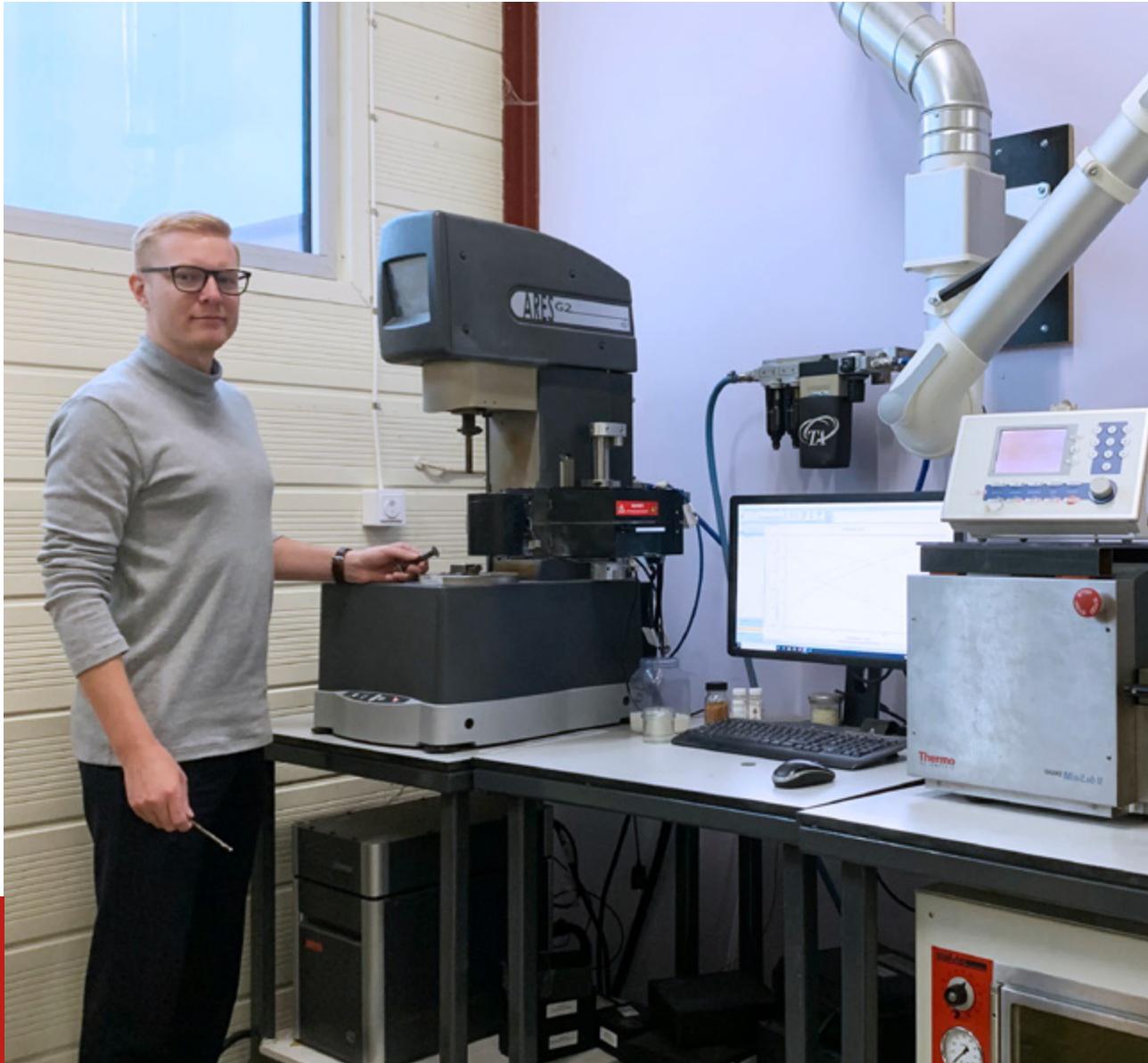
“The fact that these are issues that attract a lot of interest was evident from the many questions and discussions that followed. In particular, they focused on topics such as processability, function and the possibility of combining different materials into new hybrid solutions. Many came back to the fact that we

need plastics, but that they can – and must – be made more sustainable,” says Lars Öhrn.

During the day, participants learned how to increase the amount of recycled plastics in products without compromising their quality, and how recycled carbon fibres can be used for reinforcement. Participants were also treated to inspiring case studies from DBI Plastics about its process for replacing fossil-fuel based plastics with bioplastics, Grundfos about its work with recycling the materials from old pumps, and Dantoy about their pioneering use of bioplastics for toys.

“For us in the industry, this was an opportunity to share experiences and make new business contacts to continue building sustainable plastics that help us in our everyday lives,” says Lars Öhrn.

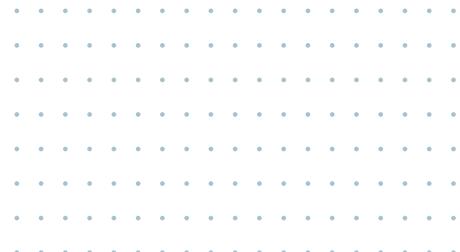
Read more about Reactive Recycling on our [Linkedin](#) and in our [previous articles](#).



Erik writes his Thesis at Nexam

Nexam Chemical wants to make it easier for students to enter the job market by offering internships and the opportunity to write a thesis with the company. Erik Sjöberg is studying to become a chemical engineer at Lund University, and he is currently writing his master's thesis at Nexam. Since last summer, he has been investigating how recycled PET can be turned into a sustainable, cheap, and lightweight construction material for one of Nexam's customers.

”For me, Nexam would be a perfect company to work for!”



At the end of October, the results will be presented, and Erik is currently working intensively with the last sections of his thesis. Over the summer, he has carried out about 100 experiments, melting recycled PET, and adding Nexam's chemicals to see what combinations and quantities give the best properties when reconstructing the product.

“I have examined two different recycled polymers that have been melted with the aim of reusing them in applications that require lightweight structural materials. I have used different chemicals to test how the viscosity can be restored after the plastics have been melted,” explains Erik Sjöberg.

“Depending on the polymer and what the plastic has previously been used for, different amounts and types of chemicals are required to get a good result. This will then be compared with the properties of virgin PET to see if Nexam's products, combined with recycled polymers, perform as well.”

For Erik, this is somewhat of a dream for the future. To be able to work on something that makes a difference and that has a positive impact on the world, without anyone knowing that he is the one behind it.

“Recycled polymers are an exciting area where I see great potential today. Just think of all the plastic in India and China and if it could be recycled!”

In just over a month, the 30-year-old engineer-to-be from Staffans-torp, Skåne, will graduate.

“Before I came to Nexam, I had never heard about the company. During my weeks here, I have received great guidance and gotten to know what it's like to work as an engineer in the industry. Around here, people really help each other to find the best solutions. For me, Nexam would be a perfect company to work for. We'll see what opportunities might open up when I have finished my thesis,” concludes Erik.

Internship valuable for all parties

Dr. Francesco Pisciotti, CTO at Nexam, lets us know that they have recently started welcoming students to the development department. The initiative is also valuable for the company.

“As a fast-growing company, it is important to have an agile and flexible organization. Welcoming students is part of our long-term recruitment strategy. During an internship or an essay work, we have time to get to know the person and the student gets to practice at work for real. If the conditions are right from both sides, it can lead to us getting a new employee”, says Francesco and continues:

“We give of our time, share knowledge and contacts, at the same time we get new perspectives from the academy and also the opportunity to strengthen our employer brand towards a very relevant target group of potential future employees”.



Dr. Francesco Pisciotti,
CTO, Nexam Chemical

Market focus: Recycled plastic

It's not only good for the environment to make the industry more circular and to use plastic waste in a sustainable way. It's also beneficial for the actors present in the supply chain. The recycle market is growing when actors choose to invest in recycled plastic as an alternative to fossil fuels and materials. In 2019, the global market for recycled plastic was valued at 45.1US\$ billion, and it's expected to grow annually at a rate of 5 percent until 2027.

Today, the plastic recycling market is characterised by a few actors in each region, many of which are local instead of multinational. This does not mean that large multinationals are passive. Due to an increased public interest in reducing the environmental footprint of plastic products, large multinational companies have begun to set more ambitious targets towards a more circular economic approach.

There are financial gains available in the recycle market, as most of the recycled plastic trade at a 20-40 percent discounts to 'virgin' (new, oil-based) plastics. This makes plastic recycling financially attractive to plastic converters. The higher the price of oil, the more attractive recycled plastics become. Given the long-term scarcity of oil, the financial benefit might increase over time.

However, if oil prices are low, the financial benefits of recycled plastics are fading.

There is also an interest inside the European Union (EU) to further expand the market. In 2018, the European Commission presented its 'Strategy for Plastics in a Circular Economy'.

With it, the organization announced its vision for a fourfold increase in sorting and recycling capacity for plastics from 2015 to 2030. In 2019, Europe was the second largest regional market for plastics recycling, accounting for almost a quarter of the global recyclate production and consumption.

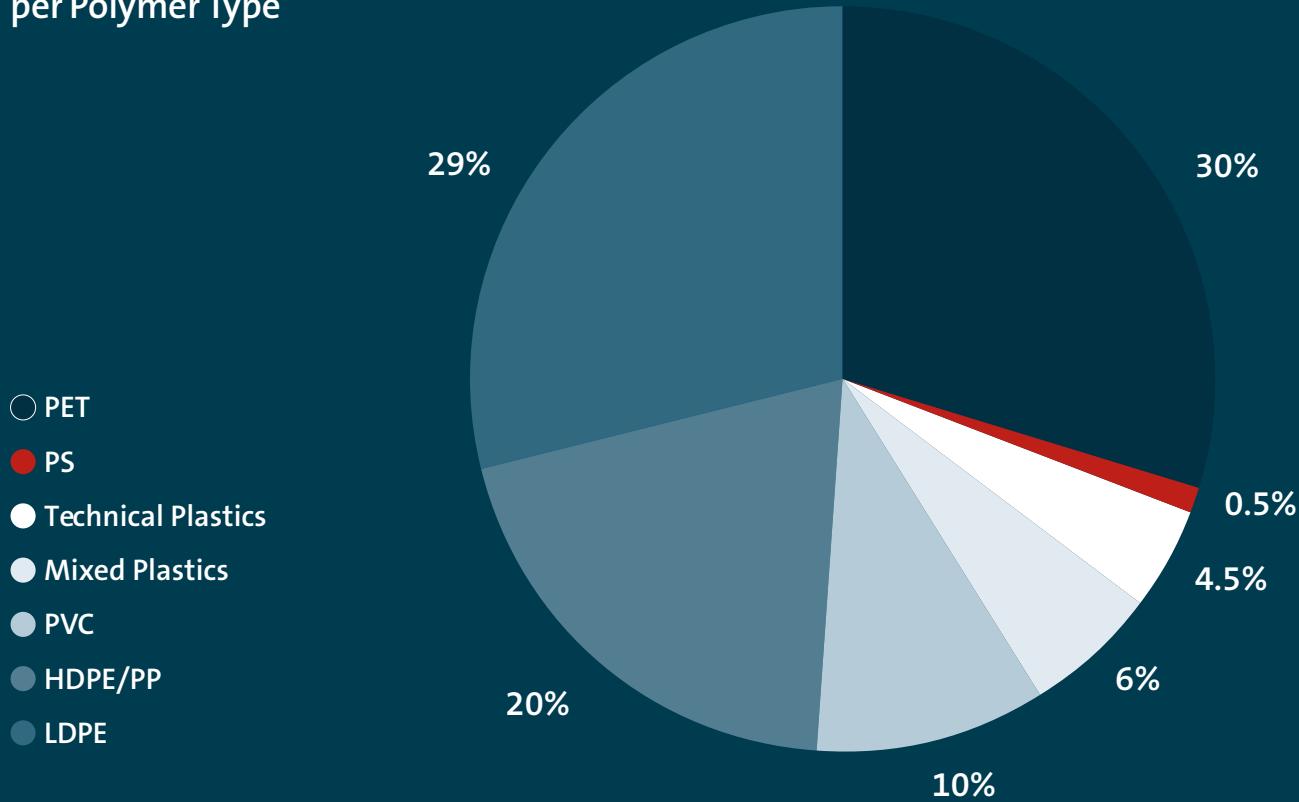
Five key statistics for the European Recycle Market 2020

- ① +600 companies
- ② +20 000 employees
- ③ +8.5 Mt installed capacity
- ④ +3bn euro in turnover
- ⑤ 5 countries cover 67% of the total recycling capacity (Germany, Italy, Spain, Great Britain and France).

* Statistics obtained in 2019



Share of installed Recycling Capacity per Polymer Type



The international recycling markets

The Chinese National Sword Policy (implemented in 2017) transformed the global plastic recycling industry. Before the policy, China imported over 7 million tonnes of plastic wastes. As of now, the country only imports nominal levels. However, China remains the largest producer of plastic recyclate accounting for almost 30 percent of global production in 2019. AMI forecasts that China's recyclate production will more than double by 2030, making it the fastest growing market in the world.

Without any federal recycling law that governs the market, the plastics recycling market in the US is less developed than in Western Europe. In 2019, only 12 percent of the plastic waste in the US was recycled¹.

Northeast Asia is home to some of the most established waste collection infrastructure in the world, capturing large quantities of potential feedstock for recycling. However, much of the waste captured is incinerated for energy, instead of being recycled.

Challenges for the market

Because most recycling companies are small and local actors, their procedures are not standardized, and they have insufficient industrialization and operational excellence. The key challenge for the market is seen as maximizing the recycling yield and quality while minimizing costs. As a result, industry profitability is relatively low. This offers recycling companies little room to adapt to market changes or to invest in their operations, such as new technology.



Plastteknik Nordic

EXHIBITION

Nexam Chemical exhibits at Plastteknik Nordic 2021

Plastteknik Nordic is a trade fair for the plastic and rubber industry in the Nordic countries. At Plastteknik Nordic, Nexam Chemical will present their solutions in recycling for plastic processing companies and for recyclers. The fair is a natural space for Nexam to showcase its technology and strengthen its brand.

The fair will be held in Malmö between the 1st and 2nd of December. You will find Nexam in stand E:16.

“We are looking forward towards meeting both our current and future clients and partners. The fair represents a useful place for discussing the challenges the industry is facing and its needs to find collaborations which results in effective solutions”, says Tomas Eriksson, CCO at Nexam Chemical.

PORTRAIT

Oskar Tuwesson – New Board Member of Nexam Chemical

Oskar Tuwesson was elected as a new member of Nexam Chemical's Board of Directors at the Annual General Meeting in May 2021. Let's get to know Oskar a little better.

PHOTO: Mårten Hirsch



Tell us a little about your background.

I have a master's degree in business administration from Lund University and have subsequently worked at various investment banks for over 15 years, including Bank of New York in London, Shanghai, and Hong Kong, followed by JP Morgan in London. After my time abroad, I worked as an equity analyst at Carnegie and then in capital markets transactions at Pareto Securities and ABG Sundal Collier.

In 2016, a colleague and I started an Investment Banking Boutique called Zonda Partners, which is one of the largest players when it comes to capital raising in Swedish life science. I have completed almost 100 transactions in Swedish listed companies over the years.

How did you come to be part of Nexam's board?

If the company continues to develop in the current direction, hopefully my capital markets expertise will be able to contribute to the company's continued growth journey.

What do you think of Nexam's journey so far and in the future?

I'm excited to be part of Nexam, a company that is working in an innovative and sustainable way to improve plastics, an area that will become increasingly important. Nexam has done well in commercialising its product area, and the company has developed in a way that has provided a good foundation for continued growth. Going forward, it will be very important to make sure that we have several legs to stand on with our broad product offering.

Who are you in your everyday life?

I like travelling and cooking. My three kids are still quite young, so most of my spare time is spent with family and friends in similar family configurations.

PORTRAIT

Martin Roos – New Board Member of Nexam Chemical

Martin Roos was elected as a new member of Nexam Chemicals' Board of Directors at the Annual General Meeting in May 2021. Let's get to know Martin a little better.



Tell us a little about your background.

I have a master's degree in chemical engineering, as well as a master's degree in economics. I launched my career at Ericsson, where I worked for 12 years. I spent most of that time abroad – in Italy, South Africa, Brazil, Panama, and Puerto Rico among other places. My last position at Ericsson was Head of Caribbean and Central American markets. After that, I moved to one of my clients, Cable & Wireless Communications (CWC),

where I took on the role as CEO in the 14 English-speaking islands of the Caribbean. After having done that for a few years, I continued on the operating side as CEO of telecom operator Altice in the Dominican Republic. In 2018, I moved back home to Sweden, where I am currently working on a number of board assignments and investments.

How did you come to be part of Nexam's board?

I had my eye on the company and thought it was interesting. I am already on the board of Seamless Distribution Systems, and some of the people associated with SDS also have connections to Nexam. They appreciated my contributions on the other board and thought I could be of value for Nexam as well. It's a good fit given my international background and the fact that I put a lot of focus on marketing, sales, and strategy. I also have a background in chemistry, but it's been more than 20 years since I was in a lab.

What do you think of Nexam's journey so far?

It has been an incredibly exciting journey. Nexam has gone from being a bit of an aspirational company with a few specialty chemicals, to turning some of these into successful products that are growing rapidly. It has also added masterbatch productions to its business, an interesting complementary niche. It's amazing to see companies develop like this. Nexam is a great example of Sweden's entrepreneurial spirit.



“When the volumes are low, we need to be efficient. In the long term, the company needs to grow to be able to gain economy of scale for some products.”

There are many smaller companies with great expertise in specific areas that manage to become international on a small scale while still growing. It's great to see. Few countries have that kind of dynamism. There is a great deal of ambition and drive here.

The timing couldn't be better for Nexam, as our motto is to make better plastics for the future. There are many things we wish we could do without, but plastic is a material that is definitely here to stay. So, it's incredibly interesting to be involved in a company that can make the material better and more recyclable. It's very motivating that the company has a higher purpose.

What are the things Nexam must focus on going forward?

One of the most important things is that the company can play a big and significant role in making plastics greener. Partly by facilitating increased recycling, for which we've just launched new products, and partly by improving the performance of standard plastics, like our successful PET foam, and perhaps also bioplastics.

Demand for green plastics is growing in the market, but a lot of the plastics that come from sugar canes or forests do not have the same mechanical or physical performance as traditional plastics. Nexam's reactive chemistry can improve the mechanical properties and physical performance of plastics. If we can achieve this with bioplastics as well, we can make them a more realistic option for many industries.

Although Nexam has had great success in recent years, it is a relatively small company. This requires a continued focus on flexibility, speed and keeping costs as low as possible. When the volumes are low, we need to be efficient. In the long term, the company needs to grow to be able to gain economy of scale for some products.

Who are you in your everyday life?

After having lived abroad for almost 20 years, I'm back in Stockholm again, and I really like it here. I am married and have two children aged 13 and 11. My family likes to travel, cook and eat, and we recently got a cat.



NATIONAL COMPOSITES CENTRE

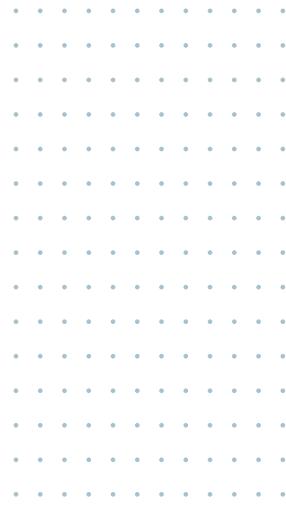
Cooperation with the National Composites Centre

With the aim of increasing the performance at high temperatures of structural composites, Nexam and the UK's National Composites Centre (NCC) have entered a partnership following a three-year development programme. The results of the research project enabled the development of a new generation high-temperature carbon fibre composite for aerospace and automotive applications using NEXIMID® polyimide resin.

Continue on next page



“Through Nexam's product and a moulding tool that we designed and produced at the NCC, we have developed a completely unique solution.”



The Bristol-based National Composites Centre (NCC) is a world-leading innovation centre for composites. As a research and development partner of the industry, the NCC helps companies produce lighter, stronger, smarter, and more sustainable products.

For the past three years, Nexam Chemical and the NCC have been developing and testing composites to withstand high temperatures.

“We help companies tackle pressing societal challenges in sustainability by, for example, making products lighter, stronger and smarter. By producing more sustainable materials, we also create greater potential for faster product innovation,” says David King, Advanced Research Engineer at the NCC.

With Nexam Chemical's NEXIMID® resins and the NCC's technology development, the collaboration and product innovation aims to facilitate operations for UK aerospace and automotive sectors while maintaining process safety during manufacturing. These industries have

demanding requirements in terms of durability and temperature variation of their manufacturing components.

“Our new composite is truly the next generation composite. Through Nexam's product and a moulding tool that we designed and produced at the NCC, we have developed a completely unique solution, which is also safe to use in industrial environments,” says David.

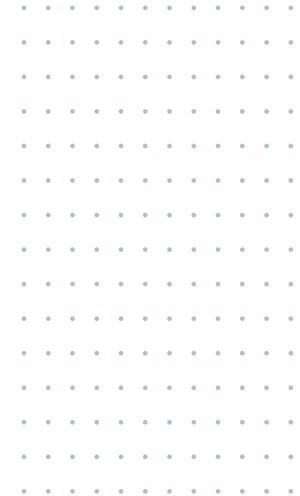
As NEXIMID® is manufactured at Nexam's production facility in St Andrews, all components of the compound are manufactured within the UK.

“The fact that the technology is developed locally and that Nexam has a production facility here provides an extra sense of security for our customers,” adds David.

With the completion of the three-year development project, Nexam has decided to become a member of the NCC's research programme. The NCC's main research programme aims to solve some of the



“We get the opportunity to test and further develop our products while helping the industry to move in a sustainable direction.”



biggest challenges that the industry faces in the use of advanced materials, with a particular focus on sustainability and hydrogen economy.

The cross-industry research programme involving the NCC's member organisations has now entered its eleventh year. Over the years, the urgency to find composites that will enable technologies to help the UK achieve climate neutrality has only increased. Listed below are the main areas of the 2021/2022 research programme.

“When reviewing the NCC research programme, it quickly becomes clear that Nexam's new product development roadmap, technology and strategy fits well with many of the projects underway at NCC. This is the ideal scenario a development company like Nexam should be involved in. We get the opportunity to test and further develop our products while helping the industry to move in a sustainable direction. Moreover it is a great opportunity not only to network with end-product developers and manufacturers but also a chance to understand their needs and application requirements during early development stages” says Dr. Francesco Pisciotti, CTO of Nexam.

NCC Core Research Programme 2021/22 projects

HYDROGEN

- Composite Cryogenic Tanks
- Composite Pressure Vessel Hydrogen Permeability

SUSTAINABILITY

- Recycling End-of-Life Composites
- Recycling of Composite Manufacturing Waste
- Composite Design for Sustainability
- Recycled Composites Supply Chain

DURABILITY

- Composite Interface and Durability

HIGH VOLUME

- Overmoulding of Butt Jointed Aerostructures

HIGH TEMPERATURE

- AFP of Ceramic Matrix Composite Materials
- Fire Resistant Structural Composites
- Increase Hightemperature Composite Capability

EXPLORATIVE

- Modular Infusion



Calendar

2021

10-21-2021

Interim Report January-September 2021

01-26-2022

Year End-report 2021