RENEWABLE MATERIALS CONFERENCE 2022

10-12 May – Cologne, Germany

Conference Journal

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nova Institute for Ecology and Innovation

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renewable-materials.eu

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FREE WIFI
Network ID nova-Conference
Password #2022RMC

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REALTIME COMMENTS
Join at sli.do
#2022RMC #2022FineRMC

Corona Information

As a safety measure, wearing an FFP or surgical mask indoors is required by the venue.
At your seat, when eating and outdoors, you may of course remove your mask.

11 May, 20:00 Meeting point for a social evening gathering

Kölsch Brewery:
FRÜH am Dom, in the "Wappensaal"
Am Hof 12–18
(500 m from the cathedral)

Match-Making Tool for On-site Networking and More

Every registered participant has received a link to the match making landing page to activate the match-making tool.
After you have been logged in successfully, you can directly arrange meetings with other participants of your choice.

- Find new networking and business opportunities before, during and after the event
- Manage all your on-site meetings in one simple user-friendly environment
- Get email alerts for meeting requests
- Chat with participants on-site and online
- Have the event programme available at any time

You need support?
Please contact Freya Sautner
freya.sautner@nova-institut.de

PROGRAM
OF THE CONFERENCE

Day 1 14

10 May 2022
9:30 – 18:00 (CET)

Bio- and CO_2-based Refineries

Chemical Industry, New Refinery Concepts & Chemical Recycling

Dinner Buffet

Day 2 18

11 May 2022
9:00 – 18:00 (CET)

Renewable Chemicals and Building Blocks

Renewable Polymers and Plastics – Technology and Markets

Parallel Session: Fine Chemicals 24

Innovation Award "Renewable Material of the Year 2022" 27

Get-together in Kölsch Brewery: FRÜH am Dom, in the "Wappensaal"

Day 3 34

12 May 2022
9:00 – 17:00 (CET)

Latest nova Research

The Policy & Brands View on Renewable Materials

Biodegradation

Renewable Plastics and Composites

SAVE THE DATE

New Location: RHEIN SIEG FORUM

RENEWABLE MATERIALS CONFERENCE 2023

23 – 25 MAY 2023

RENEWABLE MATERIALS CONFERENCE 2022

RENEWABLE MATERIALS CONFERENCE 2022

10–12 May
Cologne, Germany
renewable-materials.eu

A warm welcome to our Renewable Materials Conference 2022!

Michael Carus
CEO

Chemical, plastics and materials industries are facing a challenging transition from their fossil feedstock base. Meanwhile, research and start-ups are actively exploring new, more sustainable process routes for renewable carbon sources as well as innovative molecules with new properties. But also large-scale chemistry has been very active for years. One of its goals is to extend the existing Verbund sites for renewable carbon sources.

Fossil resources are finite. While their extraction and utilisation are deemed to be by far the biggest cause of climate change, their consumption forces a majority of countries into dependency on a very few countries with large reserves of crude oil, natural gas and coal. An often dangerous dependence that makes them vulnerable and unstable. Therefore, fossil resources must be phased out, but the products of the chemical, plastics and materials industries require carbon.

So it is all about defossilisation. Decarbonisation is no option in the material world, unlike in the energy sector, where decarbonisation is a good option in most areas. In consequence, it is about developing renewable carbon sources and there are three options to choose from: biomass, CO_2 and recycling. Biomass and recycling already cover about 20 – 25 % of the current carbon feedstock in the European chemical industry. The remaining 75 – 80 % turn out to be more challenging. There are still many political, legislative, technical and economic hurdles to overcome.

Together with our high-calibre conference advisory board, we selected the most interesting presentations and innovations from the many submissions that we have received: 60 presentations and six innovation award nominees. Our aim is to give you an overview and in-depth perspective of the current state of the art in the use of biomass, CO_2 and recycling, especially chemical recycling, and above all, to introduce you to emerging trends in renewable chemicals, polymers and all sorts of renewable materials. Additionally, we will give you the opportunity to influence these trends yourself with the election of the “Renewable Material of the Year 2022”.

We wish all of you exciting insights, numerous discoveries and inspirations, but above all intensive networking after a long period of suffering due to the Corona pandemic. And, if the weather plays along, also fun in sunny Cologne on the Rhine.

Michael Carus and his team
CEO of nova-Institute

P.S.: Since we assume that the Renewable Materials Conference will continue to grow and we could hardly meet the demand this year, we will move next year’s conference to Siegburg, a small town between Cologne and Bonn (very easy to reach), on May 23rd till 25th.
Learn more about it in this brochure on page 42.

nova Institute for Ecology and Innovation

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Registration

renewable-materials.eu/registration

Venue & Accommodation

Maternushaus
Kardinal-Frings-Str. 1–3
50668 Köln (Cologne)
Germany

Phone: +49 (0)221 1631-0
frontoffice@maternushaus.de
www.maternushaus.de

Recommended Hotels
www.renewable-materials.eu/venue

Entrance Fee

3 Days | 10–12 May 2022
"Live" in-person event incl. dinner buffet &
"Virtual" online component
1295 €

"Virtual" online component (10–12 May 2022)
595 €

1 Day | 10 May 2022
"Live" in-person event incl. dinner buffet &
"Virtual" online component
645 €

1 Day | 11 May 2022
"Live" in-person event & "Virtual" online component
645 €

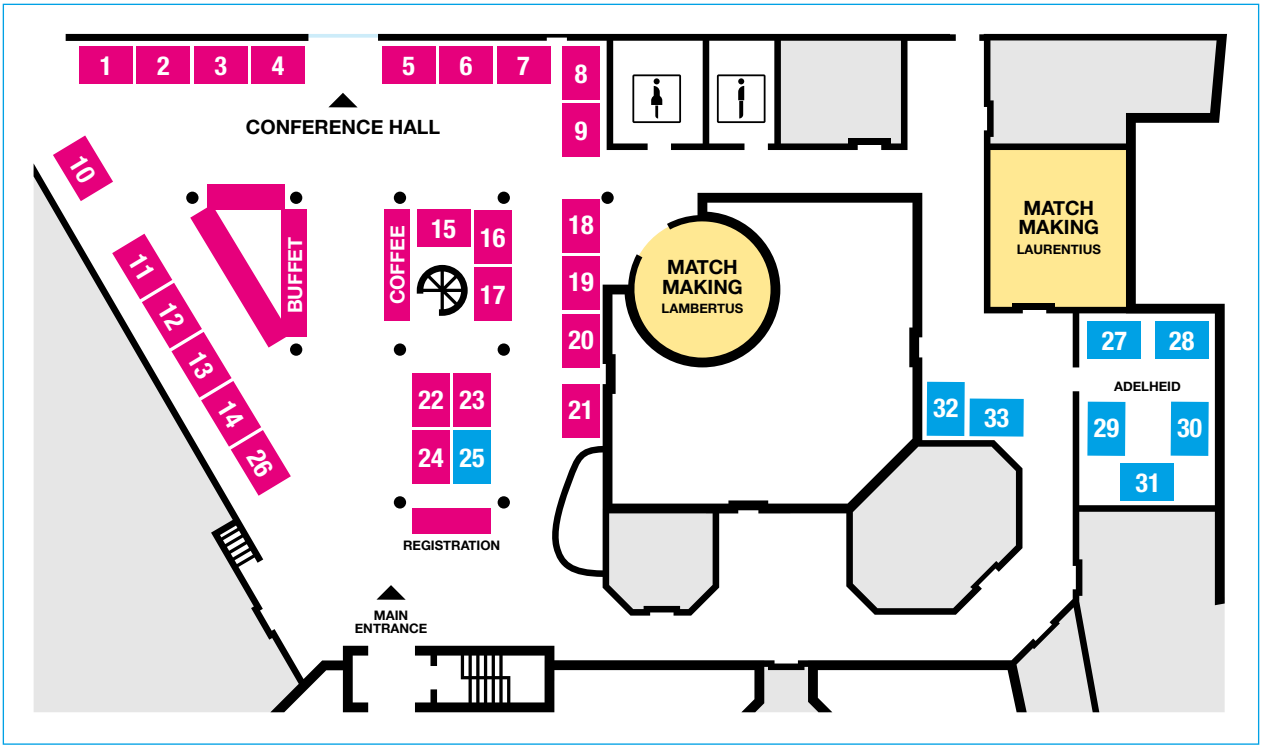
1 Day | 12 May 2022
"Live" in-person event & "Virtual" online component
645 €

3 Days | Students, 10–12 May 2022
"Live" in-person event incl. dinner buffet &
"Virtual" online component
350 €

Exhibition

Free Booked

renewable-materials.eu/exhibitors



List of Exhibitors

Booth 01 Poster Session
Booth 02 traceless (DE)
Booth 03 Avantium (NL)
Booth 04 Covestro (DE)
Booth 05 CLIB – Cluster Industrial Biotechnology (DE)
Booth 06 nova-Institute (DE)
Booth 07 Alfa Laval (SE)
Booth 08 Media Table
Booth 09 RENOLIT (DE)
Booth 10 FKUR (DE)
Booth 11 Sugar Energy (CN)
Booth 12 Sorona (US)
Booth 13 Henkel (DE)
Booth 14 SunCoal (DE)
Booth 15 NESTE (FI)
Booth 16 J. Rettenmaier & Söhne (JRS) (DE)
Booth 17 Plantics B.V. (NL)
Booth 18 Match Making
Booth 19 Innovation Award "Renewable Materials of the Year 2022"
Booth 20 Otto A. Müller Recycling GmbH (DE)
Booth 21 Robert KRAEMER GmbH & Co. KG (DE)
Booth 23 Tech4Biowaste
Booth 24 helianPolymers
Booth 26 BlackIP GmbH (DE)

Status: 25 April 2022 – more exhibitors expected: renewable-materials.eu/exhibition-booking

Poster Session

The poster session will take place during the lunch break of the second day.
All accepted posters will be displayed at booth 1 in the conference exhibition area.

Beta Analytic (US):
Biobased Testing & Certification of Polymers & Plastics

Next Technology Tecnotessile (IT):
FISH Chitinolytic Biowastes FOR FISH Active and Sustainable Packaging Material

CeNTItvc - Centre for Nanotechnology and Smart Materials (PT): Chemical Modification of Biogenic Silica Nanoparticles for Enhancement of Polymeric Formulations

nova-Institute for Ecology and Innovation

Technology & Markets

- Market Research
- Innovation & Technology Scouting
- Trend & Competitive Analysis
- Supply & Demand Analysis
- Feasibility & Potential Studies
- Customised Expert Workshops

Communication

- Comprehensive Communication & Dissemination in Research Projects
- Communication & Marketing Support
- Network of 60,000 Contacts to Companies, Associations & Institutes
- Targeted Newsletters for 19 Specialty Areas of the Industry
- Conferences, Workshops & nova Sessions
- In-depth B2C and Social Acceptance Research

Sustainability

- Life Cycle Assessments (ISO 14040/44, PEF Conform)
- Carbon Footprint Studies and Customised Tools
- Initial Sustainability Screenings and Strategy Consultation
- Holistic Sustainability Assessment (incl. Social and Economic Impacts)
- GHG Accounting Following Recognised Accounting Standards
- Critical Reviews for LCA or Carbon Footprint Reports

Economy & Policy

- Strategic Consulting for Industry, Policy & NGO's
- Political Framework, Measures & Instruments
- Standards, Certification & Labelling
- Micro- and Macroeconomics
- Techno-Economic Evaluation (TEE) for Low & High TRL
- Target Price Analysis for Feedstock & Products

nova-Institute is a private and independent research institute, founded in 1994. nova offers research and consultancy with a focus on the transition of the chemical and material industry to renewable carbon.

What are future challenges, environmental benefits and successful strategies to substitute fossil carbon with biomass, direct CO_2 utilisation and recycling?
What are the most promising concepts and applications?
We offer our unique understanding to support the transition of your business into a climate neutral future.

Our subjects include feedstock, technologies and markets, economy and policy, sustainability, communication and strategy development.
Multidisciplinary and international team of 45 scientists.

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THE RENEWABLE CARBON INITIATIVE

Shape the Future of the Chemical and Material Industry

Renewable Carbon Initiative (RCI) was founded in September 2020. RCI members are committed to create a sustainable, fossil-free future for the chemical and material industry.

RENEWABLE CARBON INITIATIVE

Bio-based | CO_2-based | Recycling

Circular Economy

WHY JOIN RCI?

RCI is an organization for all companies working in and on sustainable chemicals and materials – renewable chemicals, plastics, composites, fibres and other products can be produced either from biomass, directly via CO_2 utilisation, or recycling.

RCI members profit from a unique network of pioneers in the sustainable chemical industry.

RCI OFFERS ITS MEMBERS

- A common voice for the renewable carbon economy.
- Increased visibility of their individual renewable carbon solutions.
- Collective advocacy work to create a supportive regulatory and economic framework.
- Support in finding solutions for your specific problems on the way to your renewable carbon goals.

MEMBERS

ALPLA, avantium, BASF, Beiersdorf, BioBTX, BOREALIS, CLARIANT, clariter, Cosun Beet Company, covestro, DUPONT, Firmenich, FKuR, Givaudan, Henkel, IBB Network GmbH, iff, IKT Kunststoff Technik Stuttgart, LanzaTech, Lenzing, MANE, NESTE, nova, PCC, reckitt, SHV ENERGY, SULZER, SUNCOAL, TripleW, TÜV AUSTRIA, Unilever, uniper, UPM BIOFORE BEYOND FOSSILS, VAUDE, Verbio, WACKER

PARTNERS

CO2 VALUE EUROPE, ECBP, GLOBAL CO2 INITIATIVE, GO!PHA, TextileExchange, WWF

JOIN NOW

Become a part of the Renewable Carbon Initiative (RCI) and shape the future of the chemical and material industry
www.renewable-carbon-initiative.com/membership/application

More members, partners and information
www.renewable-carbon-initiative.com
Contact: **dominik.vogt@nova-institut.de**
#renewablecarbon

Renewable Carbon Initiative (RCI) Draws Worldwide Attention

From international brands to leading chemical and bioeconomy companies to innovative start-ups for CO_2 utilisation, companies are collaborating to guide a smart transition from fossil carbon to renewable carbon

The climate crisis is accelerating at an unprecedented pace, with global warming, greenhouse gas emissions and deforestation leading to food insecurity, global health problems and biodiversity loss. What is the primary cause of human-made climate change? The usual answer is: CO_2 and other greenhouse gases. But is CO_2 really the core of the problem? Might it not be more relevant to consider where CO_2 originates? Recent climate data indicates that 72% of anthropogenic climate change comes directly from extracted fossil carbon from the ground, while the other 28% comes from agriculture and forestry – mainly land-use change and livestock production. Presenting the first part of the new Intergovernmental Panel on Climate Change (IPCC) climate science report in August 2021, the UN Secretary-General António Guterres warned that fossil fuels are destroying the planet, and that the report *"must ring the death bell for coal and fossil fuels."*

In other words, CO_2 is not at the core of the climate problem. CO_2 can actually be cycled between atmosphere, biosphere and technosphere. Instead, the core issue is the additional fossil carbon that is taken out of the ground via crude oil, natural gas or coal, which is utilised in our technosphere and ultimately released in the atmosphere as additional CO_2 or other emissions. The conclusion is clear: in order to rapidly mitigate climate change and achieve our global ambition for greenhouse gas emission reductions, the inflow of further fossil carbon from the ground into our system must be reduced as quickly as possible and by high volumes. In the energy and transport sector, this means a vigorous and fast expansion of renewable energies, hydrogen and electromobility, the so-called decarbonisation of these sectors. But the chemical and material industries have a high demand for carbon and are essentially only possible with carbon-based feedstocks, as most of their products cannot do without carbon. Unlike energy, these sectors cannot be decarbonised and molecules will still need carbon. Instead, it makes much more sense to talk about defossilisation – a term that is becoming increasingly important in the context of new carbon thinking and carbon management.

In December 2020, the Bioenergy International Journal pointed out that the International Energy Agency (IEA) recently highlighted 'blind spots' of the global petroleum system. The journal emphasises the importance of petrochemicals, their prevalence in everyday products and their relevance to manufacture many parts of the modern energy system.
In light of the terrible war in the Ukraine, the renewable carbon concept becomes even more relevant. The defossilisation of our entire economic system is about more than climate protection only, it is also about the independence of economies that are not viable without fossil raw materials today.

The **Renewable Carbon Initiative (RCI)** was created after observing the struggles of the chemical and material industry in facing the enormous challenges to meet the climate goals set by the European Union and the sustainability expectations held by societies around the globe. It was clear that the industry has to go beyond using renewable energy and also consider their raw materials. Because decarbonisation is not an option for the chemical and material sector, as it is entirely based on the use of carbon, an alternative strategy is required: defossilisation through renewable carbon.

www.renewable-carbon-initiative.com

Eleven leading companies from six countries founded the RCI on 23 September 2020, with nova-Institute as the initiator, executive office and scientific backbone with more than 40 scientists from a wide spectrum of expertise. A year and a half later, RCI has grown to nearly 40 members, 6 partners and more than 200 individual supporters.

The initiative aims to support and speed up the transition from fossil carbon to renewable carbon for all organic chemicals and materials. The RCI addresses the core problem of climate change, which is largely related to extracting and using additional fossil carbon from the ground.
The vision is stated clearly: By 2050, fossil carbon shall be completely substituted by renewable carbon, which is carbon from alternative sources: biomass, direct CO_2 utilisation and recycling. The founders are convinced that this is the only way for chemicals, plastics and other derived products to become more sustainable, more climate-friendly and part of the circular economy – part of the future. The RCI urges the industry to go beyond just using renewable energy and face the issue that ALL fossil carbon use has to end, as the carbon contained in the molecules of organic chemicals and materials is prone to end up in the atmosphere sooner or later as well. Only a full phase-out of fossil carbon will help to prevent a further increase in CO_2 concentrations.
Michael Carus, CEO of nova-Institute and executive manager of the RCI: *"This is about a fundamental change in the chemical industry. Just as the energy industry is being converted to renewable energies, so renewable carbon will become the new foundation of the future chemical and material industry."*

For the first time since the industrial revolution, technology allows us to decouple chemical, plastics, fibre and other material industries from the use of fossil carbon. This is a fundamental game-changer, which inherits the potential for significant impact on climate protection since most of the embedded carbon in global commodities and consumer goods finds its way into the atmosphere.

The last few decades have given rise to multiple technological pathways to completely replace fossil carbon with sources of renewable carbon: biomass, direct CO_2 utilisation (from industrial flue gases, fermentation or the atmosphere), and mechanical and chemical recycling. The renewable carbon strategy unites these sources and provides companies with a framework for future investments by creating sufficient space to operate. It also provides a strategic direction to reduce fossil carbon dependency, ultimately eliminating fossil carbon utilisation altogether. This material transformation is driven by a diverse mix of international brands and start-ups.

The RCI aims at fostering networks among its members and building new value chains to replace fossil carbon with renewable carbon. Since its launch, the initiative has been busy raising awareness and reaching out to industry, policy and the public. Besides creating a website with comprehensive information and marketing related press releases, the RCI regularly holds public webinars to address questions around renewable carbon (www.renewable-carbon-initiative.com/events/). Video clips introducing each member of the RCI and their motivation are available on the RCI YouTube channel (www.youtube.com/channel/UCyYmD4O6aGH5akqpxHzAqxQ) and a comic as a playful option for sharing and understanding the renewable carbon concept has been released. To bring the networking between RCI members to the next level, the Renewable Carbon Community was launched in autumn 2021, an online platform that has developed into the heart of RCI cooperation and discussions.

A current milestone of the RCI activities is the publication of the fundamental policy paper *"Renewable Carbon as a Guiding Principle for Sustainable Carbon Cycles"* in February 2022, which comprehensively presents and explains the entire renewable carbon concept and makes eleven concrete recommendations to policymakers (www.renewable-carbon-initiative.com/media/library/). Why it is right to choose renewable carbon as a guiding principle for sustainable development in the chemicals and materials sectors and what does this mean for future policy?

To decouple chemistry from fossil carbon, the key question is which non-fossil carbon sources can be used in the future. Rapid developments in biosciences and chemistry have unlocked novel, renewable and increasingly affordable sources of carbon, which provide us with alternative solutions for a more sustainable chemicals and materials sector.

These alternative sources are: biomass, utilisation of CO_2 and recycling. They are combined under the term "renewable carbon". When used as a guiding principle, renewable carbon provides a clear goal to work towards with sufficient room to manoeuvre for the whole sector. It enables the industry to think out of the box of established boundaries and stop the influx of additional fossil carbon from the ground.

The systematic change to renewable carbon will not only require significant efforts from industry, but must be supported by policy measures, technology developments and major investments. In order to implement a rapid and high-volume transition away from fossil carbon, and to demonstrate its impact, a supportive policy framework is essential. The emphasis should be put on sourcing carbon responsibly and in a manner that does not adversely impact the wider planetary boundaries nor undermines societal foundations. An overarching carbon management strategy is required that also takes specific regional and application-related features into account, to identify the most sustainable carbon source from the renewable carbon family. This will allow for a proper organisation of the complex transition from today's fossil carbon from the ground to renewable energy and to renewable carbon across all industrial sectors.

RCI has developed eleven concrete policy recommendations on renewable carbon, such as carbon management, support for the transformation of the existing chemical infrastructure and the transformation of biofuel plants into chemical suppliers. In March and April 2022, RCI has a been in a number of meetings in Brussels with different Directorates General and industry associations to discuss the recommendations and anchor them in future policy. The messages of the Renewable Carbon Initiative (RCI) were met with great interest, open doors and a willingness to rethink – on the one hand because of the advancing climate crisis, and on the other hand because of the Ukraine war, which has highlighted Europe's problematic dependence on Russian crude oil and natural gas.
RCI's internal work is organised in working groups in which all members can participate. The Policy Working Group comprehensively analyses European policy (in the future potentially also Asian and American policy), works on several policy papers and responds to different consultations.

The working groups "Sustainability" and "Recycling" exchange information at a high level on the latest developments in their fields, e.g. Scope 3 emissions. And the Labelling WG is developing a Renewable Carbon Share (RCS) label, which should be available from the end of the year.

In the first year a lot of background information was provided, this year several fundamental publications will be published on carbon flows in the world and in Europe, potential GHG reduction potential of chemistry through alternative carbon sources, utilisation of CO_2 versus sequestration, food vs. non-food in the bioeconomy and on LCA methodology.

In summary, the RCI's activities reflect the needs of its members: awareness-raising for renewable carbon, promoting the strategy, political lobbying, providing background data and information on the concept and its potential impact, networking opportunities and building new value chains to replace fossil carbon with biomass, direct CO_2 utilisation and recycling.

Michael Carus explains the success of the initiative: *"Nothing is more powerful than an idea whose time has come. I can't explain the success any other way. It was obvious that the embedded fossil carbon had to come into focus in the world of chemistry and materials now that there are far-reaching strategies for the energy sector. For two reasons: with the increasing decarbonisation of the energy sector, the GHG emissions of material use are becoming increasingly visible and relevant. Moreover, the chemical and plastics industry in particular needs a sustainable strategy that gives it enough leeway to become an accepted part of the future again. The time is right and new companies are joining the Renewable Carbon Initiative every month, so we see strong momentum and are happy that the members seem to be very satisfied with our activities and impacts."*

RENEWABLE CARBON INITIATIVE
CO_2
renewable-carbon-initiative.com

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Clean energy
Energy efficiency
Circular economy
SUSTAINABLE PARTNERSHIP

Robust, proven technology for biobased processes

Chemicals and materials produced from biomass will play a key role in our transition to a circular economy. And biobased chemical, fuel and plastic production is expected to grow.

To process biomass, additional separation steps are needed. Alfa Laval can provide these critical mechanical and thermal separation steps for successful biomass production.

Visit www.alfalaval.com/sustainablesolutions/bio-based-chemicals

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Avantium: Leadership in Innovative Renewable Technologies

We at Avantium believe that the world is moving to a new, circular economy that is not dependent on fossil fuels. Today, over 90% of plastics products and packaging derive from fossil sources. Avantium wants to change this paradigm.

We develop innovative chemistry technologies across industry value chains in order to produce chemicals and materials based on renewable feedstock instead of fossil resources. Materials like PEF (polyethylene-furanoate), a 100% plant-based and 100% recyclable plastic with superior performance properties compared to PET. We have also developed a process to produce plant-based MEG (mono-ethylene glycol), a component for making everyday consumer goods like PEF and PET plastics. These plant-based chemicals and materials can fulfil the demand for next-generation materials that are environmentally friendly and recyclable.

Do you want to be part of accelerating the transition to a fossil-free world? Visit us at: avantium.com

avantium

Day 1

Tuesday, 10 May 2022
9:30 – 18:00 (CET)
Maternussaal (Ground Floor)

Conference Opening

09:30 **Michael Carus**
nova-Institute (DE)

Bio- and CO_2-based Refineries


Chairpersons
Michael Carus & Achim Raschka
nova-Institute (DE)

09:40 **Annelie Jongerius**
Avantium (NL)
Electrochemical CO_2 Reduction to Formic Acid in the Heart of an Urban Biorefinery

10:00 **Stefano Facco**
Novamont (IT)
The Vertical Integration of Biorefineries

10:20 **Barbara Gall**
UPM Biochemicals (DE/FI)
Novel Solutions for More Sustainable Elastomers and Thermoplastic Materials

10:40 **Babette Pettersen**
LanzaTech (BE/US)
A New CarbonSmart™ Future

11:00 **Panel Discussion with all Speakers of the Session and Special Panelists**

11:20 **Coffee Break**

11:50 **Peep Pitk**
Fibenol (EE)
Wood to Sugars, Lignin and Unique Microcrystalline Cellulose Industrial Scale-up

12:10 **Manuel Clauss**
Fibers365 (DE)
Fibers365 – Truly Carbon Negative Virgin Fibers and Bio-based Chemicals from Annual Plants

12:30 **Svetlana Obydenkova**
Maastricht University (NL)
Environmental and Economic Perspectives of the Novel Lignin Valorisation Route – Lignin First Biorefinery Concept

12:50 **Panel Discussion with all Speakers of the Session and Special Panelists**

13:10 **Lunch Break**

Chemical Industry, New Refinery Concepts & Chemical Recycling


Chairpersons
Michael Carus & Matthias Stratmann
nova-Institute (DE)

14:40 Paul Bremer
rheingold (DE)
Sinner or Savior: Psychological Potentials and Challenges of the Chemical Industry in the New World

15:00 Jens Hamprecht
BASF (DE)
Net Zero Emissions and Plastic Circularity – How Do We Get There

15:20 Lars Börger
NESTE (DE/FI)
Renewable Carbon in Practice – Large Scale Transformation in the Chemical Industry

15:40 Panel Discussion with all Speakers of the Session and Special Panelists

16:00 Coffee Break

16:30 Jason Pierce
Eastman (US)
Enabling a Circular Economy for Plastics: Life Cycle Assessment for Two of Eastman's Commercial-scale Advanced Recycling Solutions – Methanolysis and Carbon Renewal Technology

16:50 Wolfgang Hofer
OMV Downstream (AT)
OMV ReOil® – Chemical Recycling – a Technology Enabling the Recycling of Plastics Complementary to Mechanical Recycling

17:10 Christian Strebel
Haldor Topsoe (DK)
PureStep™ – Tackling Challenges on Converting Plastic Pyrolysis Oil into Drop-in Renewable Naphtha

17:30 Dhivya Puri
Fiberight (UK)
Chemicals and Materials from Municipal Solid Waste

17:50 Panel Discussion with all Speakers of the Session and Special Panelists

18:00 Networking

20:00 Dinner Buffet at Maternushaus

21:00 Michael Brandkamp
European Circular Bioeconomy Fund (ECBF) (DE)
ECBF – A New Fund for the European Circular Bioeconomy

GOLD SPONSOR

Henkel

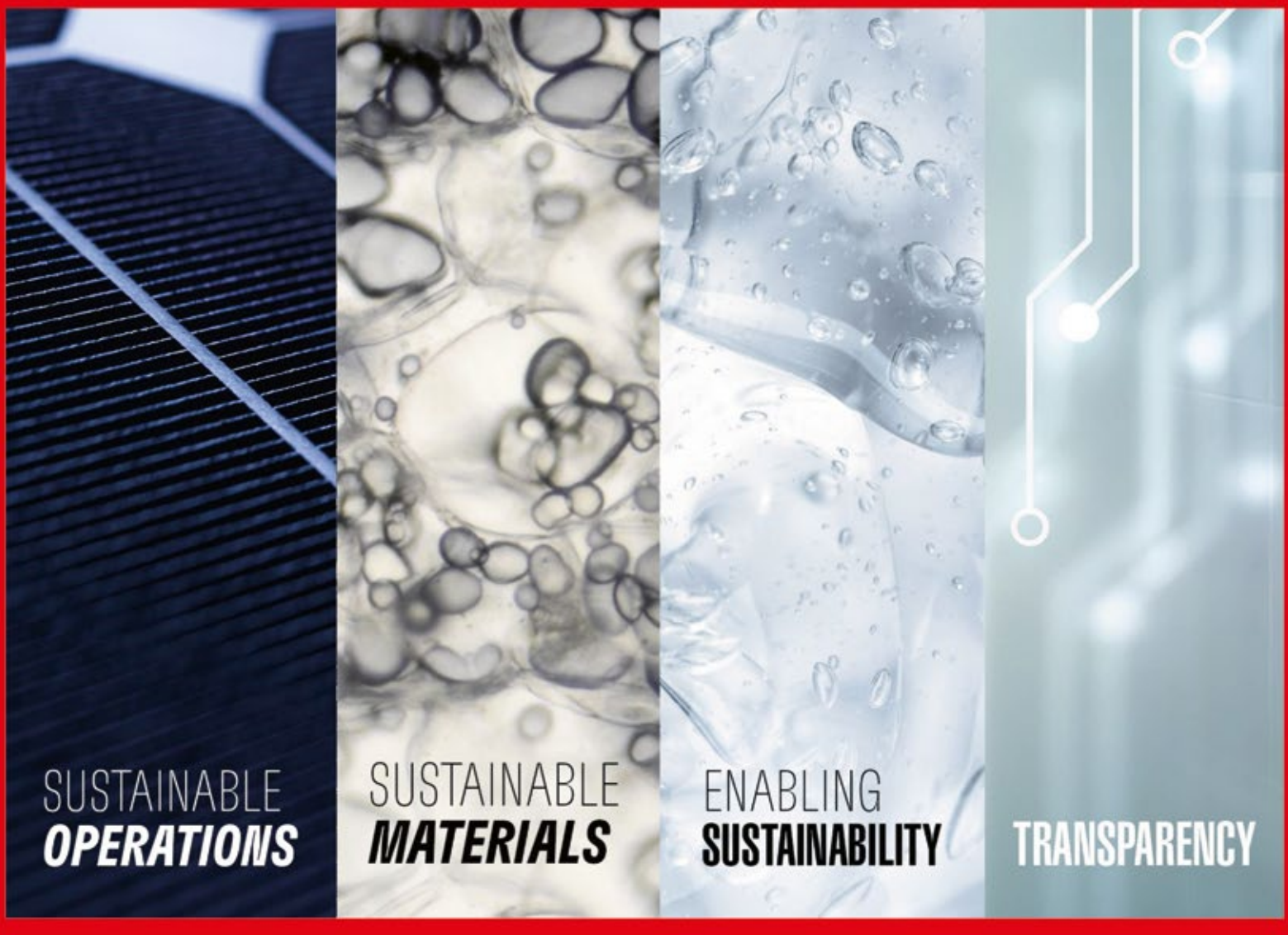
SUSTAINABILITY. WE MAKE IT HAPPEN

At Henkel Adhesive Technologies, it is our vision to contribute to solving global challenges by enabling sustainability through material science and scientific know-how in bonding, sealing and coating.

To do so we lead by example and optimize our own footprint – by driving continuous improvements in our operations and using sustainable raw materials.

Building on this, we drive sustainability at our customers by providing innovative solutions that enable emission reduction and circularity.

And we do all this supported by end-to-end transparency, reliable data and consistent measurement.



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-

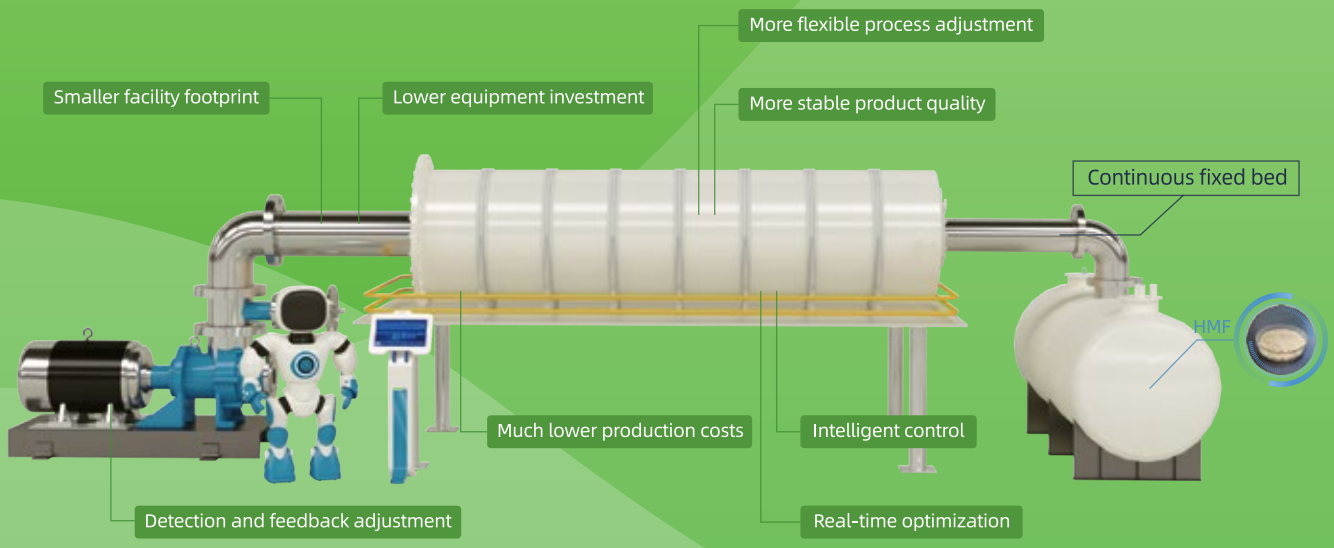
Specializing in the Design and Development of Furans Bio-based Materials

- Solved the bottleneck hurdle of HMF downstream applications
- Achieved thousand ton scale industrial production

Product Introduction

HMF / FDCA
THFDM / OBMF



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Mobile | +86 13942649359
Landline | +86 0571-86777732

View Company Website

Day 2

Wednesday, 11 May 2022
9:00 – 18:00 (CET)
Maternussaal (Ground Floor)

Conference Opening

09:00 **Michael Carus**
nova-Institute (DE)

Renewable Chemicals and Building Blocks


Chairpersons
Michael Carus & Achim Raschka
nova-Institute (DE)

09:10 **Paul Könst**
TNO (NL)
Renewable Bio-Aromatic Building Blocks: Biorizon Platforms Established, Time for Impact!

09:30 **Doris De Guzman**
Tecnon OrbiChem (US)
Renewable Chemicals and Building Blocks: An Overview

09:50 **Christian Lenges**
IFF (US)
Sustainable Material Innovation – Engineered Polysaccharides

10:10 **Panel Discussion with all Speakers of the Session and Special Panelist: Bernhard Urwyler, SugarEnergy (CN)**

10:30 **Coffee Break**

Renewable Polymers and Plastics – Technology and Markets


Chairpersons
Michael Carus & Achim Raschka
nova-Institute (DE)

11:00 **Philippe Reutenauer**
Compagnie Léa Nature (FR)
Call for Action from a Brand Owner: Which Future for Bio-based Plastics in Fast Moving Consumer Goods' Packaging

11:20 **Bineke Posthumus**
Avantium (NL)
PEF, the Next Generation Plant-based Plastic with Unique Properties

11:40 **Jan Ravenstijn**
Jan Ravenstijn Consulting / GO!PHA (NL)
Natural PHA-Materials: What's the Use?

12:00 **Michael Kember**
Econic Technologies (UK)
Econic Technologies – Turning CO_2 into Endless Value

12:20 Panel Discussion with all Speakers of the Session and Special Panelist: Francesco Montecchio, Alfa Laval (SE)

12:40 Lunch Break

14:10 **Otto de Bont**
Renewi (NL)
The RACE to Circularity

14:30 **Stephan Roest**
Borealis (AT)
Borealis Aims to Keep Polyolefin Plastics and Carbon in the Loop to Become 100% Circular

14:50 **Christian Ruthard**
INEOS Styrolution (DE)
Sustainable Styrenics Specialty Solutions

15:10 **Erik Schwartz**
SABIC (NL/SA)
SABIC Specialties SBU's Innovative Portfolio of Sustainable Solutions

15:30 Panel Discussion with all Speakers of the Session and Special Panelist: Hao Ding, Sorona/Dupont (US)

15:50 Coffee Break

Innovation Award "Renewable Material of the Year 2022"


Chairpersons
Michael Carus & Asta Partanen
nova-Institute (DE)

16:20 **Michael Carus**
nova-Institute (DE)
Introduction

16:30 **Rosasilvia Raggio**
Borregaard (NO)
Exilva® Cellulose Fibrils

16:40 **Jason Pierce**
Eastman (US)
Material-to-Material Molecular Recycling Technologies

16:50 **Marion Vincent**
Lactips (FR)
Plastic Free Paper™ with CareTips® – a Natural Polymer to Rethink Plastic

17:00 **Rich Riley**
Origin Materials (US)
Technology Platform for Producing Carbon Negative PET

17:10 **Nicholas Flanders**
Twelve Benefit Corporation (US)
Electrochemical CO_2 Transformation to Chemicals and Materials

17:20 **Andreas Kohl**
VERBIO Vereinigte BioEnergie (DE)
VerBioChem Ethenolyis Platform for Renewable Chemicals

17:30 Voting

17:40 **Thorsten Heinemann**
Covestro (DE)
Innovation Award Ceremony

18:00 Networking with Local Beer and Snacks

20:00 Meeting point for a social evening gathering: Kölsch Brewery: FRÜH am Dom, in the "Wappensaal"

18:30 – 20:00 Meeting of the Renewable Carbon Initiative (RCI) (for members only)

Towards a sustainable future together

NESTE

Change runs on renewables

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THE NEW BIOECONOMY

Bringing world-class science and engineering together to benefit the global marketplace with sustainable material innovation

DUPONT susterra bio-based performance zemea bio-based performance sorona

Current Trends in Fine Chemicals

Dennis Herzberg and Sarah Refai

Climate change is one of the greatest challenges of our time. Its direct and indirect consequences are potentially dramatic for us humans and the entire ecosystem. But how can the ongoing climate change be stopped, and the climate goals be achieved? A comprehensive transformation of our economy is needed to counter climate change, to mitigate its consequences and to preserve the environment. This transformation is relevant in all economic sectors, such as energy, transport and logistics, construction and must extend from the primary sector to industrial production processes. But also consumer behaviour is an important lever.

A main pillar of this transformation process is the reduction of CO_2 emissions and thus carbon usage. While energy supply can be decarbonised, this is not possible for the chemical and materials sector, as these are based on carbon. Additionally, increasing world population, higher incomes and a growing middle class will drive the need for products and materials and thus also for more carbon, like the latest trends on polymer demand and production published by nova-Institute show.

To rapidly mitigate climate change and achieve the goals for greenhouse gas emission reductions, the input of additional carbon from fossil raw materials to the atmosphere must be stopped. This can be achieved by using renewable carbon from CO_2, recycling streams or biomass. The chemical industry needs to largely convert its raw material basis to renewable carbon from all these sources. For the field of special chemicals, however, the use of biomass is of particular importance. Compared to bulk chemicals such as methanol, ethanol or ammonium, specialty or fine chemicals are required in much smaller quantities and volumes. On the other hand, they are characterised by a high degree of complexity and functionality, as they are needed in a plethora of sectors such as personal and home care (cosmetics, flavours and fragrances, surfactants), textiles, packaging, coatings, adhesives, or functionalised surfaces, but also the food and feed industries have a high demand for highly functionalised substances (such as flavours, fragrances, supplements, nutraceuticals, alternative proteins). Here, biomass offers the potential to preserve the inherent functionality and complexity already synthesized by nature, instead of increasing functionality step-by-step like fossil-based chemistry is used to. This approach makes it possible to produce complex fine chemicals in a more sustainable and climate-friendly way.

In addition to the use of biomass, biotechnology also plays a key role as a central cross-sectional technology for the establishment of a sustainable circular economy. Biotechnology can contribute to the production of fine chemicals with a highly selective and efficient catalysis: Besides whole-cell catalysts, the use of enzymes plays a central role. These methods can reduce the use of metal catalysts, for example, and reactions can take place under mild conditions leading to more sustainable and circular production processes. Even inert molecules such as CO_2 can be converted into complex polymers through microbial fermentation processes.

However, biotechnological production methods not only offer the advantage of producing highly complex molecules, but also offer the possibility to develop completely new building blocks for a bioeconomy and circular economy. Here, digitalisation (e.g. AI or big data), as well as synthetic biology, biomanufacturing, and bioprinting play an increasingly significant role.
Important current trends like raw material change towards renewable carbon and climate-friendly production processes, are not only on the political agenda and anchored in climate goals, the SDGs or the EU-Green Deal, but are also implemented already at industrial level. Many companies have set themselves dedicated and ambitious climate targets

and are thus setting a high pace for achieving these targets. Furthermore, many production processes and product developments based on renewable carbon or biotechnology are already established in the market or are in the final stages of development. This underlines, the willingness of the companies to actually tackle this transition and not just set ambitious goals for the future.

UPM, for example, has committed to reducing its CO_2 emissions by 65% by 2030 and is investing around 550 million euros at its Leuna site to build a wood-based biorefinery. Clariant is demonstrating innovative biotechnological solutions for the production of cellulosic ethanol from plant residues through the sunliquid® process. LanzaTech has developed a whole-cell catalysis system to produce the bulk chemical ethanol on an industrial scale. Other major manufacturers are contributing to climate change mitigation through their climate targets and bio-based manufacturing processes for a wide range of products, including Henkel, aiming to achieve a climate-positive carbon footprint for all production sites by 2030. Covestro, together with Genomatica, is developing a biotechnological process for the production of bio-based hexamethylene diamine, an important starting material for nylon-6,6. Evonik is investing a three-digit million Euro sum in the production of bio-based rhamnolipids. Furthermore, SMEs like Phytowelt Green Technologies can synthesize high-quality raspberry fragrance using a fermentation process at commercial scale.

These examples show how diverse the possible applications of bio-based and biotechnological conversion routes, production processes and products are. This will also be highlighted in the Fine Chemical Session of this year's Renewable Materials Conference. Among other things, you can expect exciting presentations on novel manufacturing processes based on wood or sugar beet, e.g. to produce fragrances, as well as insights into new sustainable technology approaches in the production of plastics, preservatives for beverages and food, the production of sustainable dyes, pigments and surfactants.

Day 2

Parallel Session
9:00 – 16:00 (CET)
3-Königssaal (First Floor)

Fine Chemicals

09:00 **Dennis Herzberg**
CLIB – Cluster Industrielle Biotechnologie (DE)
Opening of the Second Day


Moderators
Sarah Refai & Dennis Herzberg
CLIB – Cluster Industrielle Biotechnologie (DE)

09:10 **Jaime Gracia Vitoria**
VITO (BE)
Lignin Based Materials from Small Scale to Industrial Formulations

09:50 **Rosasilvia Raggio**
Borregaard (NO)
Fibrillated Cellulose as Stabilising Agent in Household, Industrial, and Institutional Product Systems


09:30 **Maud Reiter & Hazel Ustundag George**
Firmenich (CH)
From Pine to Perfume

10:10 Panel Discussion with all Speakers of the Session and Special Panelists

10:30 Coffee Break

11:00 **Thomas Farmer**
University of York (UK)
Sustainable Functional Circular Polyesters from Biomass


11:20 **Rahul Dagwar & Robert Lazeroms**
Cosun Beet Company (NL)
Sugar Beet as a Sustainable Source of Inspiration for Innovation in Bio-based Chemicals and Materials – Galactaric Acid a Novel Bio-based Corrosion Inhibitor Based on Sugar Beet Pulp

11:40 **Francesco Montecchio**
Alfa Laval Technologies (SE)
High-speed Separation for PHA Production Process: Higher Yield and Power Savings

12:00 **Jens Bitzer**
Lanxess / IMD Natural Solutions (DE)
Natural Glycolipids as Novel Preservative for Beverages and Food

12:20 Panel Discussion with all Speakers of the Session and Special Panelists

12:40 Lunch Break


14:10 **Jan-Hendrik Kamlage**
Center for Environmental Management, Resources and Energy (CURE) at Ruhr-University Bochum (DE)
&
Julia Reinermann
University Hagen (DE)
Prospects and Limits of High Performance Bio-based Ingredients in Products of Sustainable Consumption


14:30 **Math Lambalk**
Avantium (NL)
&
Marilia Foukaraki
Cosun Beet Company (NL)
From Cosun Beets to Ray Glycols: the Road to Commercialisation

14:50 **Guillaume Boissonnat-Wu**
PILI (FR)
New Bio-based Building Blocks for the Production of Sustainable Dyes, Pigments and Chemicals

15:10 **Dirk Leinweber**
Clariant (CH)
Surfactants Sustainability Transformation – Drop Ins and Novel Molecular Solutions

15:30 Panel Discussion with all Speakers of the Session and Special Panelists

15:50 Coffee Break

16:20 Innovation Award "Renewable Material of the Year 2022"

Conference Advisory Board

Christiaan Bolck
Long-time bioeconomy expert (NL)

Reinier Grimbergen
TNO Voltachem (NL)

Sarah Refai
CLIB – Cluster Industrielle Bio-technologie (DE)

Michael Costello
Stahl Holding B.V. (NL)

Christophe Luguel
IAR Association Industries (FR)

Gudbrand Rødsrud
Borregaard AS (NO)

Doris de Guzman
Tecnon OrbiChem (US)

Jörg Müssig
Hochschule Bremen – University of Applied Sciences (DE)

Alastair Sanderson
Unilever Research and Development (UK)

Ludo Diels
VITO (BE)

Jan Ravenstijn
Jan Ravenstijn Consulting (NL)

Haralabos Zorbas
IBB Netzwerk (DE)

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Dr. Christian Poppe, Technical Supervisor

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BECOME 1 of us

“Renewable Material of the Year 2022”

Six innovations are nominated. Participants at the “Renewable Materials Conference” will vote for the winners.

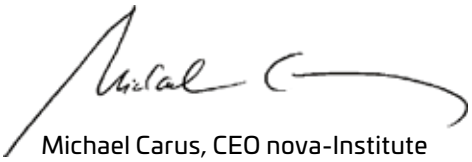
To replace the fossil feedstock base, it is about substituting crude oil and natural gas in existing chemical industry structures. But it is also about innovation, developing new processes, building blocks and materials. Rethinking chemistry and materials. Ready-to-use fossil-free sustainable material solutions with a low carbon footprint are in fast-growing demand. Innovative brand owners are keeping an eye out for such solutions, in particular those that will soon reach the mainstream.

With the innovation award “Renewable Material of the Year 2022”, we would like to award three particularly exciting and promising solutions that contribute to replacing fossil carbon from the ground. Innovations could be submitted until 15 March, and 31 came in. The Advisory Board and the nova experts had some trouble finding the six most exciting ones and nominating them for the award. Get to know the six nominees better in this small innovation brochure.

The Innovation Award is one highlight of the “Renewable Materials Conference”, 10-12 May in Cologne (Germany) with 60 confirmed speakers and more than 400 expected participants. On the second day of the conference, the nominated companies will present their products and all conference participants, on site and online, will vote for the three winners. An exciting competition that you decide.

All information and registration at: **renewable-materials.eu**

See you in Cologne
Kind regards



Michael Carus, CEO nova-Institute

Nominees of the Innovation Award

“Renewable Material of the Year 2022”

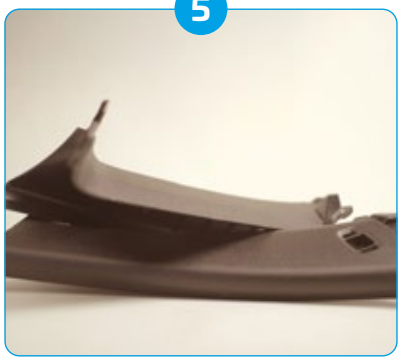
1

2

3

4

5



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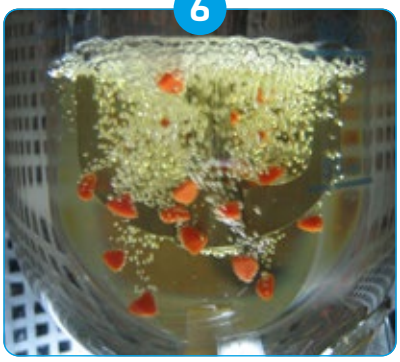


Organiser

Innovation Award Sponsor

1

Borregaard (NO)
Exilva® Cellulose Fibrils

Borregaard's Exilva®, a novel cellulose fibril from Norway Spruce. Exilva L-grade to the left, Exilva V-grade to the right

Exilva V-grade in the jar to the left, Exilva L-grade in the spray bottle to the right

In 2015, the Norwegian biorefinery Borregaard completed the construction of the world's largest plant for the production of fibrillated cellulose, and since then its innovative product Exilva® has been commercially available. Exilva® consists of highly fibrillated cellulose. It is obtained by mechanically processing cellulose pulp that comes from sustainably managed forests. The innovative aspects of this fibrillated cellulose are the high aspect ratio, the small aggregate size and the high specific surface area resulting from the efficient fibrillation process, as well as the high water retention value. Thanks to the high efficiency, robustness in harsh environments and multifunctional properties, it is suitable for a wide range of products.

More information: www.borregaard.com

2

Eastman (US)
Material-to-Material Molecular Recycling Technologies

Molecular recycled granulate – indistinguishable from virgin feedstocks

Material-to-material molecular recycling uses plastic waste as a feedstock to make new plastics, keeping the carbon in play and leaving more fossil feedstocks in the ground. The process breaks down the waste to the molecular level – which is indistinguishable from virgin feedstocks – to make new materials. These materials can be recycled over and over without degradation of quality, and is available at-scale, today. These processes are also key to Eastman's climate strategy, reducing the company's greenhouse gas emissions by 20%-50% in producing the building blocks for new materials, when compared to traditional processes.

More information: www.eastman.com

3

Lactips (FR)

Plastic Free Paper™ with CareTips® – a Natural Polymer to Rethink Plastic

The first paper packaging solution that is free from plastic or controversial substances

A generation of fully biodegradable and recyclable packaging made of natural materials

Lactips manufactures CareTips®, a natural polymer with multiple technical and performance properties that is biodegradable in various environments and supports manufacturers in their environmental and regulatory transformation. A natural polymer that offers solutions to rethink plastic and master its end of life. It is a unique solution that meets the requirements of the most stringent regulations for single-use plastics. The latest application of CareTips® is Plastic Free Paper™, a 100% bio-based coating solution for paper and board that improves barrier properties and enables thermosealing without compromising the recyclability of paper.

More information: www.lactips.com

4

Origin Materials (US)

Technology Platform for Producing Carbon Negative PET

100% plant-based PET bottle

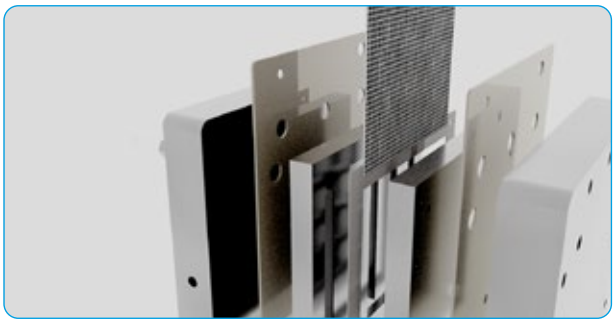
Origin Materials offers an entirely circular plastic solution: recyclable, 100% plant-based PET, which the world's plastic recycling infrastructure is already designed to collect, sort, and re-use, with the critical added benefit of removing CO_2 from the atmosphere. Origin believes that making PET plastic from sustainable wood residues is a unique and powerful solution that meets the most pressing environmental challenges of the day. Origin expects the strong demand environment to continue and remain well ahead of projected supplies for the foreseeable future.

More information: www.originmaterials.com

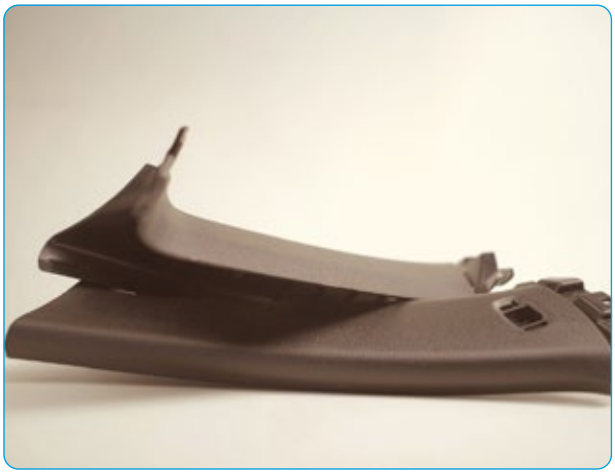
5

Twelve Benefit Corporation (US)

Electrochemical CO_2 Transformation to Chemicals and Materials



Twelve's patented membrane electrode assembly for CO_2 transformation



Twelve x Mercedes-Benz: The word's first CO_2Made® car part

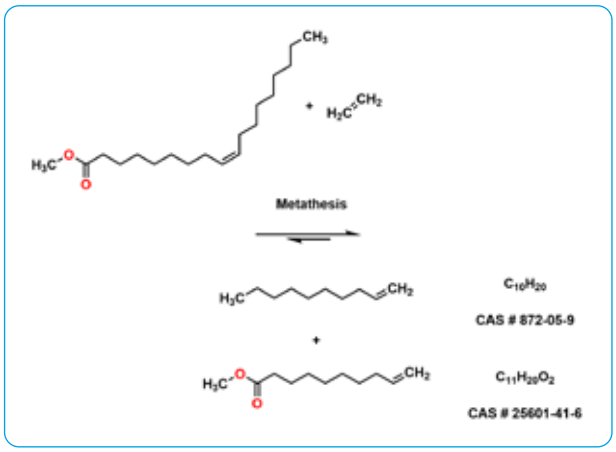
Twelve has developed a novel device that uses water and renewable energy to turn carbon dioxide (CO_2) into essential chemicals, materials, and fuels, using a new class of CO_2-reducing catalysts. Twelve is scaling to industrial systems to transform CO_2 into carbon monoxide (CO), a key chemical building block for products including car parts, furniture, building materials, jet fuel, and numerous other materials that are currently made from petroleum. By replacing the fossil carbon in chemicals with renewable, recycled carbon from CO_2, we can eliminate emissions from thousands of essential products. The first products are car parts (with Daimler), sunglasses (with Pangaia), and laundry detergent (with P&G).

More information: www.twelve.co

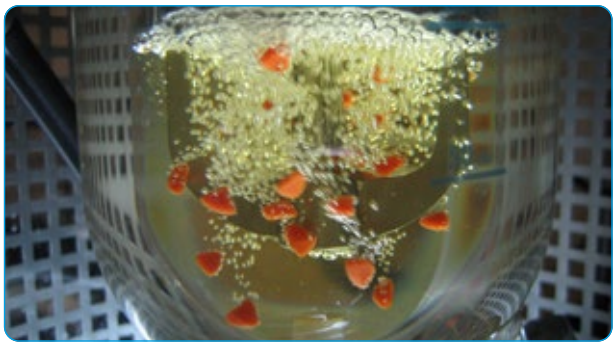
6

VERBIO Vereinigte BioEnergie (DE)

VerBioChem Ethenolyis Platform for Renewable Chemicals



VerBioChem – reaction scheme from FAME to Methyl-9-decenoate and 1-Decene by metathesis/ethenolysis



VerbioChem catalysts

VERBIO has developed the VerBioChem process for the production of specialty chemicals and polymers with a low carbon footprint from renewable rapeseed methyl esters by olefin metathesis/ethenolysis: Methyl 9-decenoate, 1-decene and C18 diacids (e.g. dimethyl 9-octadecenedioate). VERBIO is currently building a commercial-scale ethenolysis plant in Germany with a nominal capacity of 50-60 kt/a of products. The first products are expected in 2024. VerBioChem will offer renewable chemicals with a broad range of applications as an innovative platform for the chemical industry.

More information: www.verbio.de

Winners from Last Year

"Renewable Material of the Year 2021"

Most Sustainable Chair Ever from Hemp Fibers and Thermoset Bioresin

Plantics (NL) & Vepa (NL)

First Clear Plastic Bottles from Enzymatically Recycled Textile Waste

Carbios (FR)

CO_2 Recycling for CarbonSmart Cleaning

LanzaTech (US/CH)

Day 3

Thursday, 12 May 2022
9:00 – 17:00 (CET)
Maternussaal (Ground Floor)

Conference Opening

09:00 **Michael Carus**
nova-Institute (DE)

Latest nova Research


Chairpersons
Michael Carus & Mika Plum
nova-Institute (DE)

09:10 **Michael Carus**
nova-Institute (DE)
Latest Update on the Renewable Carbon Initiative (RCI)

09:20 **Lara Dammer**
nova-Institute (DE)
EU Policy Update – Fit-for-55, Taxonomy and Sustainable Carbon Cycles

09:30 **Ferdinand Kähler**
nova-Institute (DE)
CO_2 Reduction Potential of the Chemical Industry through CCU

09:40 **Lars Krause**
nova-Institute (DE)
Update on Chemical Recycling World-wide

09:50 **Pauline Ruiz**
nova-Institute (DE)
Latest Market Data on Bio- and CO_2-based Polymers

10:00 **Gillian Tweddle**
nova-Institute (DE)
Tailor-made Research & Studies – the nova Approach

10:10 Panel Discussion with all Speakers of the Session and Special Panelists

10:30 Coffee Break

The Policy & Brands View on Renewable Materials


Chairpersons
Michael Carus & Lara Dammer
nova-Institute (DE)

11:00 **Fabien Ramos**
European Commission, DG Climate (EU)
Sustainable Carbon Cycles

11:20 **Søren Kristiansen**
The LEGO Group (DK)
The LEGO Group's Renewable Material Strategy

11:40 **Arndt Scheidgen**
Henkel (DE)
Renewable Material Strategy in Laundry & Home Care

12:00 **Helmut Schmitz**
Grüner Punkt / DSD – Duales System Holding (DE)
Innovative Recycling of Flexible Packaging from the Yellow Bin – Technology and Market Development

12:20 Panel Discussion with all Speakers of the Session and Special Panelists

12:40 Lunch Break

Biodegradation


Chairpersons
Michael Carus & Lara Dammer
nova-Institute (DE)

14:00 **Andreas Künkel**
BASF (DE)
Fundamental Understanding of Biodegradability

14:20 **Miriam Weber**
HYDRA Marine Sciences (DE)
Biodegradable Plastics in Open Environments – Scientific Answers and Tools for a Holistic Evaluation

14:40 Panel Discussion with all Speakers of the Session and Special Panelists

Renewable Plastics and Composites


Chairpersons
Michael Carus & Asta Partanen
nova-Institute (DE)

15:00 **Asta Partanen**
nova-Institute (DE)
Biocomposites Granulates in Mainstream Applications

15:20 **Wridzer Bakker**
Plantics (NL)
Renewable Material of the Year 2021. What Happened Next?

15:40 **Janina Jarothe**
rezemo (DE)
Shaping the Future with Wood

16:00 **Dirk Punke**
Büfa (DE)
Unidirectionally Reinforced Biocomposites in New Applications

16:20 Panel Discussion with all Speakers of the Session and Special Panelists

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Bio-based Furan Materials

From the second half of this year, our EXW price of 5-HMF will be reduced sharply to the range between €10,000 and €15,000 per metric ton for all commercial orders in metric tons. The EXW price will be reduced to the bottom of €10,000 per metric ton for big orders starting from 500 metric tons. The final official selling price will be confirmed in August 2022.

1 CAPACITY

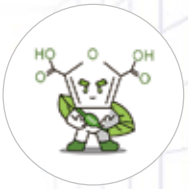
5-HMF: 250MT/MONTH

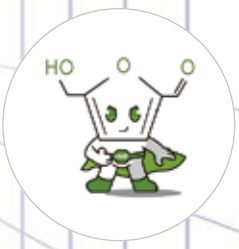
FDCA: 10MT/MONTH

2 PRICE PER TON

5-HMF: EUR10,000~15,000

FDCA: EUR20,000~25,000





Applications in China

corrosion inhibitor | antirust agent | surfactant | fire retardant | sanitiser

Currently the total demand of 5-HMF in China is above 1000MT per year.

" **Free samples** below **1kg** is avaliable
(Note: delivery cost need to be covered by the buyer) "

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The World's Leading Supplier Of 5-Hydroxymethylfurfural

Valuable Quotes

Francesco Montecchio
Alfa Laval (SE)
"Alfa Laval's separation technologies can make bioplastic production dramatically more cost effective."

Bineke Posthumus
Avantium (NL)
"Imagine a circular plant-based plastic with high performance properties and endless possibilities for application. PEF is a 100% plant-based, recyclable and degradable plastic, with superior performance properties compared to today's widely used petroleum-based packaging materials. In this presentation we will demonstrate how PEF enables a circular and plant-based future."

Jens Hamprecht
BASF (DE)
"An ambitious redesign of the plastics value chain is needed right now. I am optimistic we will achieve it through a combination of innovation power, collaboration throughout the value chain and supportive policies."

Rosasilvia Raggio
Borregaard (NO)
"Fibrillated cellulose produced by Borregaard is a nature-based, sustainable material and thanks to its multiple functionalities it can be added to HI&I products' formulations to enhance their performances and obtain unique benefits."

Philippe Reutenauer
Compagnie Léa Nature (FR)
"Today if the thirst for sustainable materials for packaging is bigger than ever, the tension on availability of currently used sustainable plastics (bioHDPE, rPET) and the absence of visibility on creation of recycling streams for new biobased plastics makes it difficult for a brand owner to forecast what will be the sustainable plastics of tomorrow."

Math Lambalk
Avantium (NL)
"Starting from Cosun sugar beets and by using Avantium's Ray Technology™, we aim to jointly contribute to a fossil free future by bringing renewable, sustainable, drop-in glycols to multiple market applications."

Bart van den Bosch
Avantium (NL)
"Electrocatalytic CO_2 reduction and hydrogen production can become economically more viable when paired with valuable oxidation reactions."

Andreas Künkel
BASF (DE)
"The fundamental understanding of biodegradability is the enabler to develop new biodegradable products, meaningful biodegradation standards and get stakeholder acceptance."

Dirk Punke
BÜFA (DE)
"Biocomposite goes High-Tech."

Dirk Leinweber
Clariant (CH)
"Clariant's journey towards a more sustainable surfactant portfolio."

Robert Lazeroms
Cosun Beet Company (NL)
"Natural corrosion inhibitor based on sugar beet pulp."

Helmut Schmitz
Der Grüne Punkt (DE)
"Flexible packaging, accounting for 44% of the total post-consumer packaging waste in the EU, already has a lot potential to become circular, built on the principles of resource efficiency, prevention of waste and pollution, but needs much more support."

Jason Pierce
Eastman (US)
"Eastman's methanolysis is a type of molecular recycling technology that will help solve the world's plastic waste crisis while also resulting in significant reduction in carbon emissions."

Fabien Ramos
European Commission (EU)
"Presentation on the key elements of the Communication on Sustainable Carbon Cycles adopted by the European Commission on December 2021."

Dhivya Puri
Fiberight (UK)
"The end of waste: A novel approach to the valorisation of resources in mixed residual waste."

Maud Reiter & Hazal Ustundag George
Firmenich (CH)
"Turning pine into perfume for the conscious consumer."

Christian Lenges
IFF (US)
"IFF, a leader in biotechnology, is enabling innovation to help our customers achieve their sustainability targets, providing an update on the Engineered Polysaccharide venture and progress towards commercial reality."

Jan Ravenstijn
Jan Ravenstijn Consulting (NL)
"Natural PHA: the sleeping giant awakens!"

Jens Bitzer
Lanxess (DE)
"Obtained from an edible mushroom, Nagardo is a biotechnological innovation for food preservation."

Michael Kember
Econic Technologies (UK)
"The presentation will highlight Econic's innovative catalyst technology that enables existing polyol manufacturers to incorporate captured CO_2 into essential products."

Peep Pitk
Fibenol (EE)
"Fibenol turns new page in commerzializing wood to biomaterials and biochemicals pathway at industrial scale."

Manuell Clauss
Fibres365 (DE)
"The holistic utilization of biomass, especially of annually re-growing plants, is the key for an effective future bio economy and sustainable carbon loop."

Christian Strebel
Haldor Topsoe (DK)
"This presentation will address typical technical challenges when upgrading pyrolysis oils and how to solve them through tailored solution approach deployed commercially."

Christian Ruthard
INEOS Styrolution (DE)
"At INEOS Styrolution our various innovations have led to sustainable drop-in solutions for our styrenics specialties products applying different recycling methods and bio-attributed feedstocks."

Svetlana Obydenkova
Maastricht University (NL)
"This presentation is about the sustainability of lignin value creation chain, i.e. how it performs while moving from low to high value applications."

Valuable Quotes

Babette Pettersen
LanzaTech (US/BE)
"By capturing the carbon contained in waste gases to produce Fuels and Chemicals, LanzaTech's gas fermentation process provides a dual benefit; both reducing emissions in industrial processes and creating value through recycling the carbon into CarbonSmart™ products, without extracting additional fossil carbon from the ground."

Janina Jarothe
rezemo (DE)
"Sustainability that works: Using wood-based and fully renewable materials for packaging of fast-moving consumer goods (FMCG) allows us to offer a high quality and environmentally friendly alternative for various products."

Jan-Hendrik Kamlage
Ruhr-University (DE)
"Sustainable consumption is a cornerstone of facing the great societal challenge of climate change in the future. So far, the acceptance and market shares of bio based ingredients in consumer products increase slowly and thus needs improved communication or additional incentives."

Paul Könst
TNO (NL)
"Biorizon established three bio-based technology platforms towards renewable aromatic building blocks: discover why, how and what's next!"

Barbara Gall
UPM (DE)
"Join us moving to a lighter and more sustainable future with the next generation of Renewable Functional Fillers for rubber & plastics applications."

Miriam Weber
Marine Sciences (DE)
"We explain a multi-tier test scheme of reliable and environmentally relevant methods that can solve the data gap problem of biodegradable plastic in the open environment."

Wolfgang Hofer
OMW (AT)
"Mechanical Recycling and Chemical recycling are the perfectly complements, in semi commercial environment."

Paul Bremer
rheingold Köln (DE)
"Oh God, we're really only surrounded by chemicals."

Erik Schwartz
SABIC (NL)
"SABIC's Specialties innovative solutions that help customers achieve their net-zero carbon goals."

Søren Kristiansen
The LEGO Group (DK)
"Creation of renewable materials requires contributions from everybody, everywhere."

Thomas Farmer
University of York (UK)
"Bio-based highly functional polyesters are readily accessible from platform molecules and offer great potential for future circular materials."

Jamie Gracia Vitoria
VITO (BE)
"From biomass waste to materials, contributing to a sustainable industry."

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Success needs more space – Renewable Materials Conference in 2023 at new location

New Location: RHEIN SIEG FORUM

Dear Business Partners, Ladies and Gentlemen,

The nova conference for Renewable Materials will take place for the third time next year. The new conference format hit the mark: already in the first year 420 participants came together – and this year we expect similar or even growing numbers of participants.

We have ambitious plans for 2023, which can only be realised by moving the conference to a larger location: The Rhein-Sieg-Forum in Siegburg. This small town has excellent rail connections to the nearest airports: Cologne/Bonn 15 min, Frankfurt 50 min. From the station it is less than 10 min walk to the location. There is a parking garage right next to the venue. Exhibits can be easily delivered.

Next year's conference will again focus on the most innovative bio-based, CO_2-based and recycled alternatives to fossil-based chemicals and materials.

As a sponsor of this forward-looking conference, you are at the forefront of the transition to a renewable chemicals and materials industry. Your company understands the major challenges such as climate change, the dependence on fossil raw material imports and the new political framework conditions as a development opportunity.

Actively support innovations, new technologies and products, but also new strategies and visions with your commitment as a sponsor – and thus actively shape the future!

Show with your sponsorship that your company is at the forefront of change!

Michael Carus, CEO nova-Institute

Your contact for sponsoring:

Guido Müller
+49 151 41423019
guido.mueller@nova-institut.de

renewable-materials.eu/sponsoring

The event will take place in Siegburg, with attendees in person meeting up with those who have booked online.

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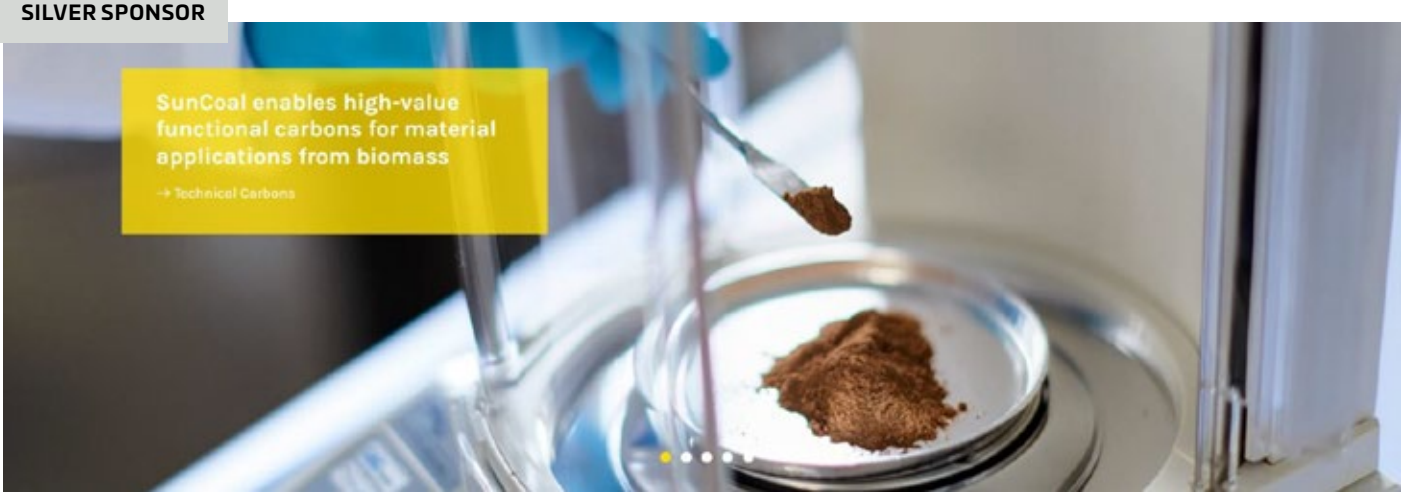

SunCoal Industries GmbH develops and markets patented technologies for the production of environmentally friendly, engineered carbons, bio-based chemicals and biofuels. In this context, SunCoal realizes plant, development, engineering and consulting projects for customers from the pulp and paper industry, the wood and forestry industry, the energy and chemical industry as well as the waste disposal industry. For this purpose, SunCoal Industries operates a technology center in Ludwigsfelde - 20 km south of Berlin - including its own ton-scale production facility, three laboratories as well as an engineering and development department.

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The Best Available on Bio- and CO_2-based Polymers & Building Blocks and Chemical Recycling

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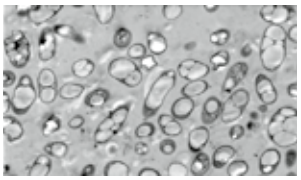
Latest trends and 28 producer profiles



Author: Jan Ravenstijn

March 2022

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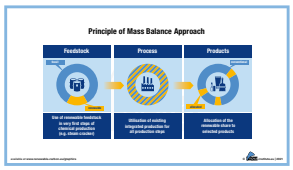
Bio-based Naphtha and Mass Balance Approach

Status & Outlook, Standards & Certification Schemes



Authors: Michael Carus, Doris de Guzman and Harald Käb

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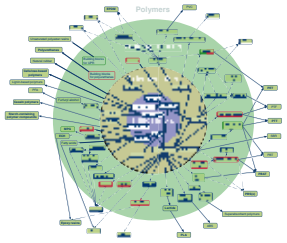
Bio-based Building Blocks and Polymers – Global Capacities, Production and Trends 2020–2025



Authors: Pia Skoczinski, Michael Carus, Doris de Guzman, Harald Käb, Raj Chinthapalli, Jan Ravenstijn, Wolfgang Baltus and Achim Raschka

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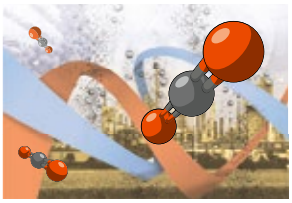
Carbon Dioxide (CO_2) as Chemical Feedstock for Polymers

Technologies, Polymers, Developers and Producers



Authors: Pauline Ruiz, Achim Raschka, Pia Skoczinski, Jan Ravenstijn and Michael Carus, nova-Institut GmbH, Germany

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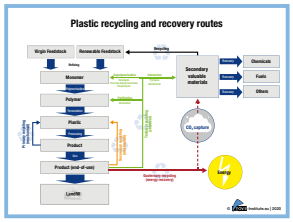
Chemical recycling – Status, Trends and Challenges

Technologies, Sustainability, Policy and Key Players



Author: Lars Krause, Florian Dietrich, Pia Skoczinski, Michael Carus, Pauline Ruiz, Lara Dammer, Achim Raschka, nova-Institut GmbH, Germany

November 2020

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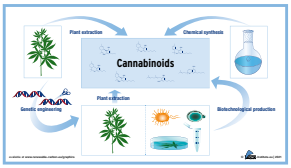
Current Technologies, Potential & Drawbacks and Future Development



Authors: Pia Skoczinski, Franjo Grotenhermen, Bernhard Beitzke, Michael Carus and Achim Raschka

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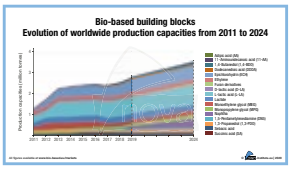
Commercialisation updates on bio-based building blocks



Author:
Doris de Guzman, Tecnon OrbiChem, United Kingdom

Updated Executive Summary and Market Review May 2020 – Originally published February 2020

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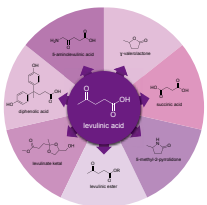
Levulinic acid – A versatile platform chemical for a variety of market applications

Global market dynamics, demand/supply, trends and market potential



Authors: Achim Raschka, Pia Skoczinski, Raj Chinthapalli, Ángel Puente and Michael Carus, nova-Institut GmbH, Germany

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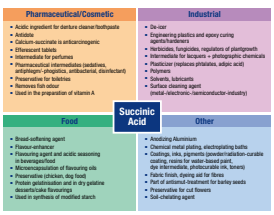
Succinic acid – From a promising building block to a slow seller

What will a realistic future market look like?



Authors: Raj Chinthapalli, Ángel Puente, Pia Skoczinski, Achim Raschka, Michael Carus, nova-Institut GmbH, Germany

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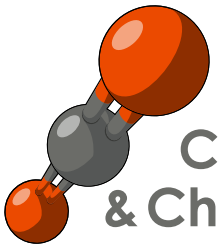

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