



**■ - BASF**

We create chemistry

# **BASF IS TEAMING UP TO BREAK NEW GROUND**

Citroën concept car “oli” created with materials and expertise from BASF.

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For more information, please explore  
[concept-car-citroen.basf.com](http://concept-car-citroen.basf.com)



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Here you'll find the latest news, stories and event updates on how we offer chemistry-driven innovation for the automotive industry.



*You need innovations, you need creative minds to bring together the thoughts of different companies. Together with our customers and other partners in the value chain who have also set themselves ambitious targets, we take more steps towards a more sustainable future every day.*

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*Projects such as the concept car are real boosters along the way.*

*This concept car shows what is possible if partners trust each other and courageously explore new paths.*

*A microcosm of ideas and solutions emerges that stretches beyond the concept.*

– Uta Holzenkamp, Team Automotive, BASF



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*Citroën oli is a striking manifesto of intelligent and optimistic ideas to challenge the status quo and propose a pure, joyful and sustainable approach to electrified mobility for all. Oli demonstrates how to achieve the lowest environmental impact while bringing fun back into a functional and electric vehicle. It means re-thinking everything from limiting the glass to reducing interior complexity, to avoiding technology duplication and lowering overall weight, to maximizing efficiency and ensuring that as many material as possible are recycled or recyclable.*

*Working in partnership with BASF was key to conceive oli and achieve the most possible fun and efficient electric 'vehicle for the near future.*

– Laurence Hansen, Citroën Product & Strategy

# A joyful cooperation: Citroën and BASF

Together with Citroën, we are going on an exciting and inspiring journey. The collaboration with our longstanding partner on this concept car all began when the BASF Creation Center took up an invitation from Stellantis to present its trend book on global consumer trends and their effects on materials. Our close links to customers from numerous industries – from sport and entertainment electronics to furnishings and architecture – allow us to offer a broad view of the products of the future.

The result is a project to create a fully electric vehicle, with actors from both companies working together openly, inspiring one another and having a lot of fun. The designers are supported by product managers and experts in simulation and 3D printing from BASF.

Together, Citroën and BASF are tackling the challenges around the core question: “What are the requirements for a vehicle of the future?” A key factor in this is answering the question of sustainability. Is it enough when a material is sustainable? Or can entire components be eliminated? Can simplicity lead to greater efficiency and also enhance aesthetics for the consumer? Sustainability can certainly be fun.

This project is constantly pushing the limits, be it by using materials in unusual ways or by fundamentally rethinking the design of a component.

The result is a seat that does not need additional ventilation, as its 3D-printed grid structure intrinsically breathes, while the vehicle floor’s design was inspired by a sneaker.

The colors create an iconic look. Many modules have a homogeneous structure – that is, they are created completely from a single material family, making mechanical recycling significantly easier.

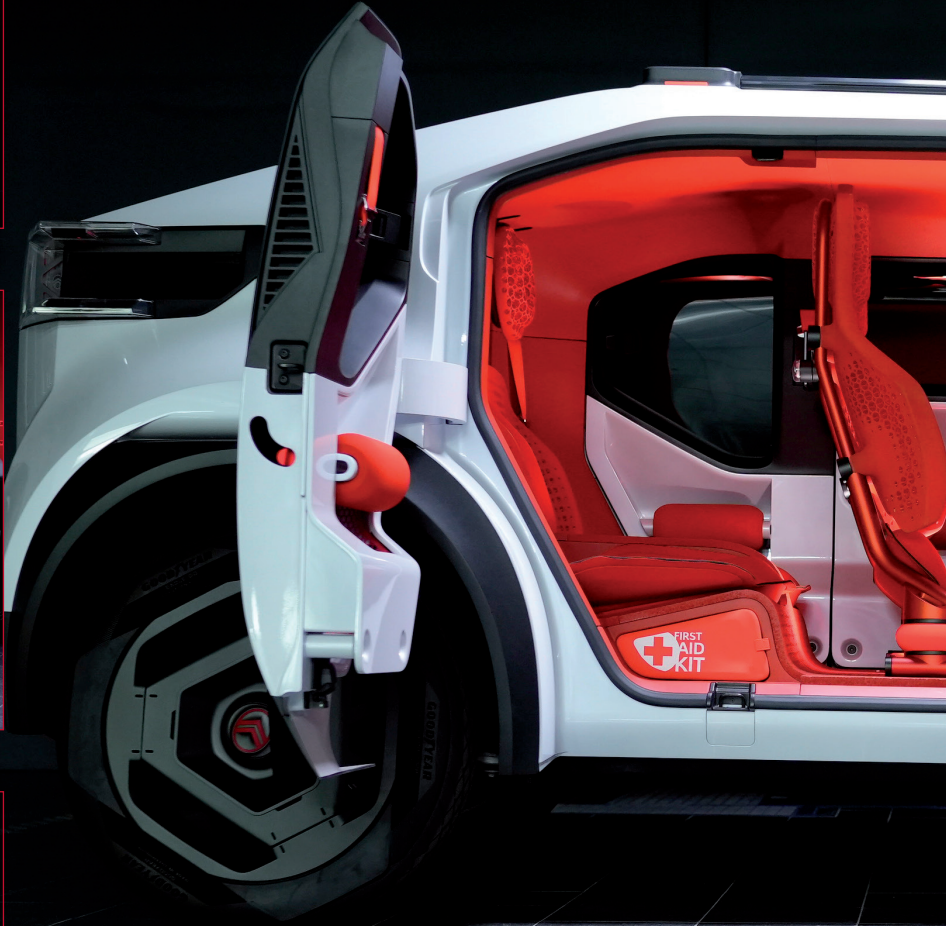
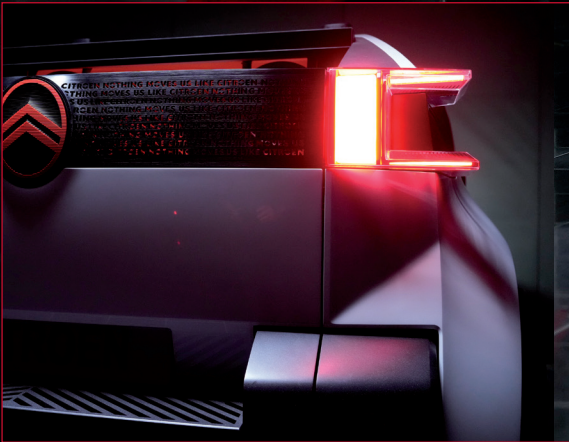
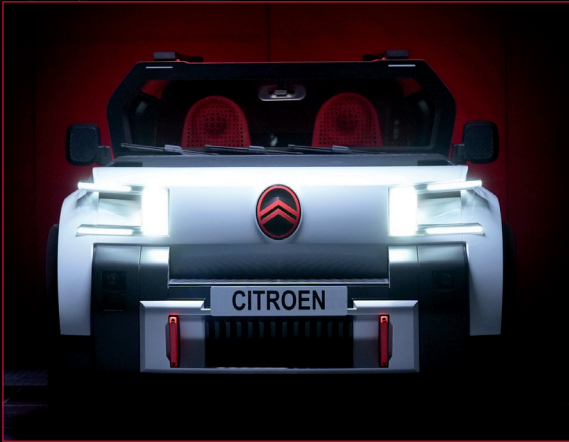
Our plastics, coatings and 3D printing technology support Citroën’s design visions, giving their ideas a bold, daring and always optimistic look and feel.



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*By reducing complexity, we improve  
our quality of life.*

– Alex Horisberger, Designer, BASF







# **BASF's innovative solutions** in the Citroën concept car

## **Have you ever thought about this?**

The primary inspiration for a product does not come from a shape design, but from a material or a technology. This is an extreme reversal and has a significant impact on design. Material first – styling later!

This also entails a certain honesty towards the materials. Disclosing the material means honesty, which in turn means sustainability. It's pure, it's real, it's what you see!



## The car interior

How to simplify my ride: create a car that withstands adventures, is multifunctional and enables an easy and joyful life.

For us it was a great motivation to pursue this concept to make the car a practical and potentially long-lasting family member.

That is why durability, recyclability and simplicity play such a crucial role in the interior's materials. One prominent example: To increase the feasibility of mechanical recycling and enhance the circular economy of the vehicle, the decision was made to select materials from a single product family. Our different TPU grades, for example, are incredibly versatile and allow different functions to be provided using only one single material. At the same time, the customer can admire the material's purity and beauty in its unadulterated origin.

A futuristic car interior with red ambient lighting. The steering wheel is prominent in the center, featuring a logo. The seats and dashboard are illuminated with a warm red glow, creating a high-tech atmosphere. The background shows a blurred view of the road ahead through the windshield.

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*We applied our competence in coatings regarding colors and functionalities to enhance the properties of the materials used in the car interior.*

– Simon Winzen, BASF





## With lattice design we combine both worlds of designers and engineers

The seats are a visionary highlight of the concept. Creating a 3D-printed component of this size was a challenging experiment. TPU material (Ultrasint® TPU88A) was used to generate complex 3D-printed geometries that are simultaneously very flexible and functional.

As a result, the team succeeded in developing a backrest including a headrest that follows the “one material” approach: Many parts in the car interior are made from the same material family. This makes mechanical recycling easier at the end of the product life cycle. At the same time, the 3D printing process ensures low-waste production and a durable material for a long product life cycle.

The concept has enhanced this durability by protecting the seats additionally with an elastic waterborne coating (Ultracur3D® Coat F), which withstands all stresses on the substrate.

No pretreatment/primer is required, even on smoothed surfaces. Therefore no need for a further skin of foam or leather. As a result, the complexity of the assemblies is reduced.

### More Information:



Ultrasint®



Ultracur3D®



## Move ahead and go beyond boundaries

The Infinergy® E-TPU used for the one-material approach stands out thanks to its long lifespan and performance. In this concept, Infinergy® makes the floor and rear armrest particularly soft yet robust. The material also provides good insulation against sound and vibrations.

Surfaces made from Infinergy® can be painted or the base material can be dyed. In the production process, the individual Infinergy® granules are simply stuck together using hot steam. The material's characteristic structure, with its individual granules, remains visible.

The concept also uses a waterborne coating for flexible substrates that provides additional protection against abrasion, UV, chemicals and dirt for an even longer product lifespan. Using NovaCoat-P means that it takes fewer steps to produce a component. This is processed by spray or dip coating. Only one layer of top coating is necessary without primer or chemical pretreatment. This can be applied using manual or automated processes.

### More Information:



Infinergy®



NovaCoat-P



## Organize your chaos through design inspired by nature

Iconic parts of the vehicle's storage area, as well as the floor plug, door handle and audio control panel, can be made from Elastollan®. This TPU offers excellent haptics and mechanics, superior long-term durability and resistance to weathering. Being a thermoplastic material, it provides simplicity in application, and can also be shaped freely using the injection molding technique.

Instead of a classic glove compartment, the designers have been inspired by nature. The flexible pins on the shelf, in an offset arrangement, allow it to hold a huge variety of items without them becoming dislodged when the car moves.

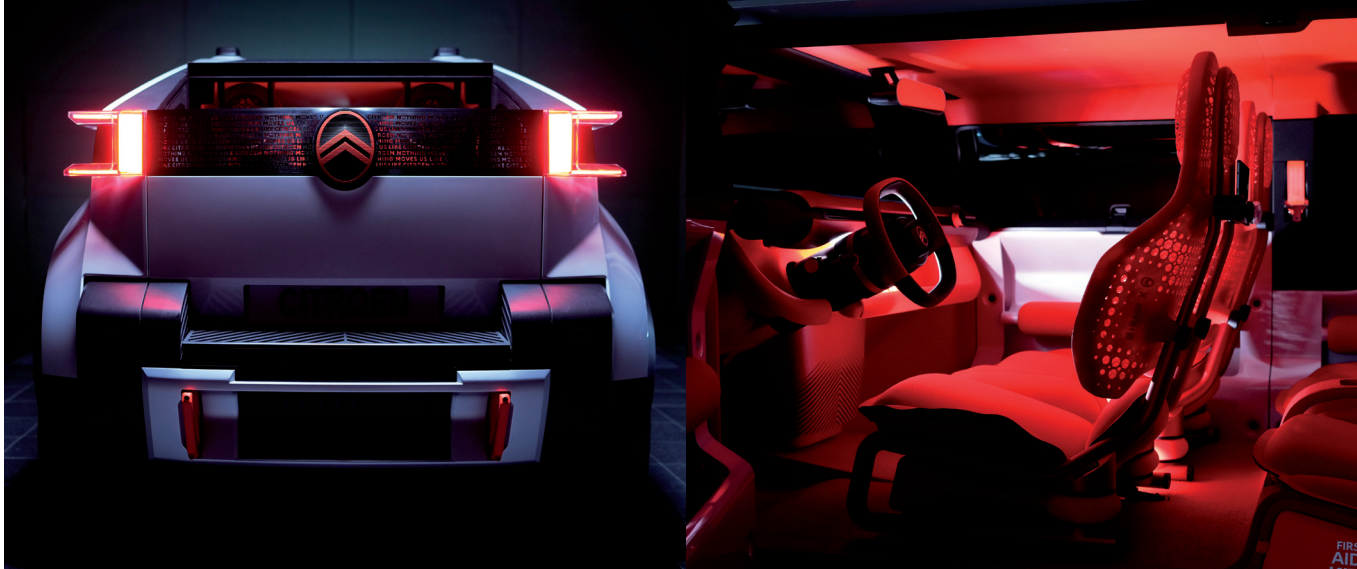
And once again, the "one material" approach is used, making mechanical recycling easily possible at the end of the product life cycle. Elastollan® can also be produced based on the BASF biomass balance approach or ChemCycling™.

### More Information:



Elastollan®





## Functional integration through metal replacement

BASF's engineering plastics support the car's clever and responsible concept.

Ultramid® polyamides have proven long-term durability in typical automotive conditions without ageing or corrosion. Functional integration – and thereby metal replacement – is a strong argument in favor of this material. Moreover, a large number of parts can be replaced with a single component thanks to the injection molding process used. This very robust material – tough, strong and stiff – is proven to last the entire lifespan of a vehicle in many highly demanding applications (gas pedal).

Ultramid® Structure, a high-performance plastic which is reinforced with long glass fibers, can be used for the brake pedal. In areas where even optimized plastics with short glass-fiber reinforcement reach their limits, Ultramid® Structure offers new opportunities for numerous applications while offering high impact strength and homogeneous surfaces.

Ultradur® (PBT) is suitable for interior applications that require good surface quality. It provides high dimensional stability with good UV resistance.

This makes it perfect for the concept's air conditioning outlet. Functional integration and metal replacement are strong arguments in favor of this material here, too.

And on top of that, these engineering plastics can be made using renewable or recycled feedstock. You can find out more about BASF's biomass balance approach and Chem-Cycling™ on the following pages. Mechanical recycling at the end of life is possible if the parts can be dismantled.

### More Information:



Ultramid®



Ultramid® Structure



Ultradur®





## The car exterior

Jump on it! The user should literally be able to stand on the hood, roof and trunk. It is built to survive all your activities! Many of the exterior materials were selected exactly in line with this principle.

Light but robust parts contribute to the long lifespan of the car. Components that are subjected to significant loads are usually rough and robust – not shiny. As such, they are not vulnerable to scratches, making them especially suitable for all kinds of fun.

As well as enhancing the vehicle's longevity, its lightweight construction also reduces the amount of energy consumed.



## Robust and simple for unlimited adventure

In contrast to multilayered metal, this combination of Elastoflex® and Elastocoat® is a simple and stable construction. You can literally stand on it!

Elastoflex® is a two-component polyurethane system specially developed for the spray impregnation process used to produce very light and stiff sandwich structures. Paper honeycomb acts as the core material which is reinforced by spray impregnated long-fiber mats made from glass or natural fibers. The polyurethane system offers long spray times, good wetting properties of the fibers and a firm bond with the core material. All in all, it is an ideal solution for lightweight semi-structural composites.

Elastocoat® is a spray coating system which seals the surface and provides a robust protection against weathering, UV and scratches.

When used together, the two products save material and reduce the weight of the car, thus leading to lower energy consumption and an extended range.

In addition to the sustainability aspects mentioned above, Elastocoat® and Elastoflex® can be produced based on the biomass balance approach or ChemCycling™ principle.

### More Information:



Elastoflex®



Elastocoat®



## A perfect match of color and concept

The color of the body perfectly conveys the concept of the car: Its complexity was reduced to the bare minimum. However, it does not compromise on aesthetics. At first glance it seems to be a pure white color, but mica particles have been added to perfectly emphasize the shape of the car. For all its simplicity, the color thus provides the necessary functionality.

Responsibility also played a major role: The latest R-M® AGILIS® waterborne basecoats are the most eco-friendly automotive refinish coatings on the market thanks to their extremely low volatile organic compound values (VOC value of below 250 g/l).

Thanks to its advanced productivity, AGILIS® helps body shops increase their performance even further. As an innovative response to current and future challenges, AGILIS® has a new pigment technology and ensures a faster process through easier application with millions of color matches to choose from.

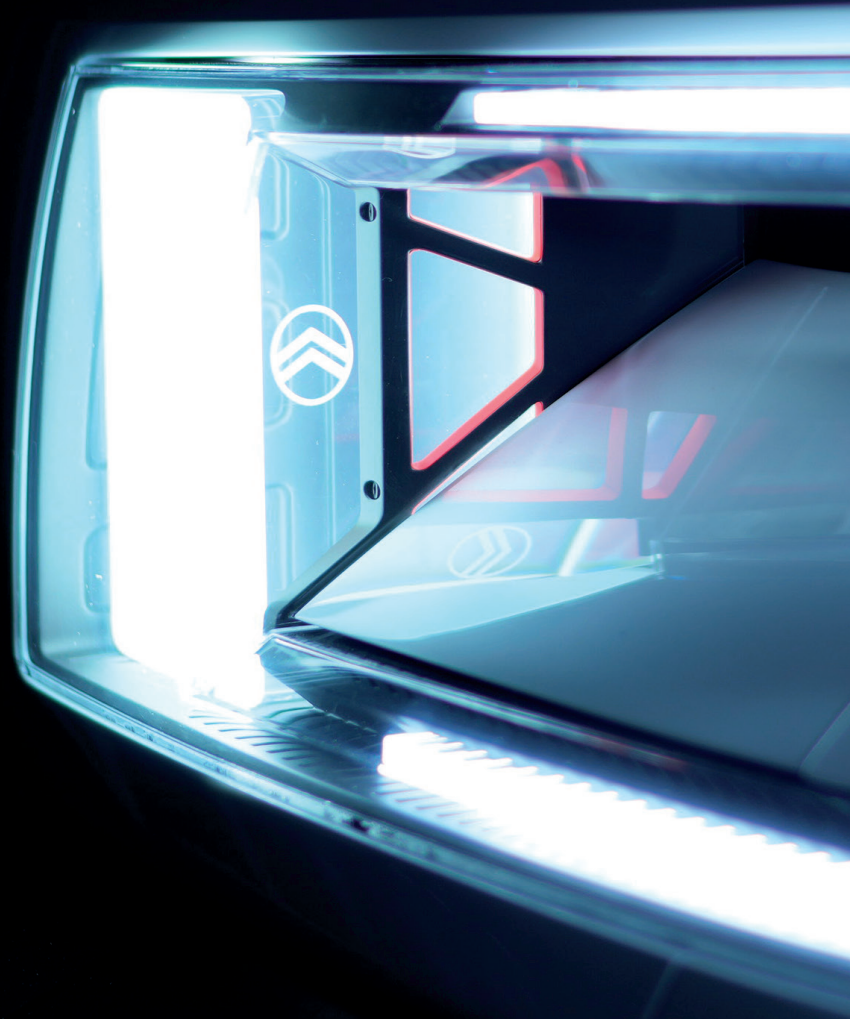
AGILIS® customers can save up to 35 % in overall process times through faster application and shorter flash-off cycles. As a multi-purpose tintable product, AGILIS® Amplifier allows new car parts to be painted in half the time while also reusing paint left over from previous jobs. The result is a huge reduction in waste and lower overall costs.

R-M®'s e'Sense Pioneer series of clearcoats and undercoats helps save fossil raw materials and reduce CO<sub>2</sub>; it is certified according to the REDcert<sup>2</sup> standard.

### More Information:



AGILIS®



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*Color and shape are one.*

– Frederic Delbecque, BASF



# Driving forward sustainable automotive solutions

We are fully committed to a sustainability strategy along the whole value chain and to drive forward sustainable automotive innovations by partnering with players in the industry. Pilot projects are a prerequisite for the commercialization of our offering and correspond to the state of the art. Furthermore, BASF is an active member of various networks with the aim of developing and establishing sustainable solutions and processes in the automotive industry.

As the issue is so urgent, we should use all avenues and ideas that lead us toward sustainable mobility. Reducing CO<sub>2</sub> emissions, meeting recycling targets and improving air quality are industry challenges we are all facing. The limited availability of fossil fuels and climate change call for more efficient cars and lower emissions. “We create chemistry for a sustainable future” – according to this principle, we develop chemistry that drives us forward while producing a reduced environmental footprint.

Recently we announced that BASF will build a commercial-scale black mass plant for recycling batteries in Schwarzheide, Germany. This investment strengthens BASF’s cathode active materials (CAM) production and recycling hub in Schwarzheide. The site is an ideal location for

concentrating the company’s battery recycling activities given the presence of many EV manufacturers and cell producers in Central Europe.

A circular economy aims to decouple growth from resource consumption and is renewable by design. As a partner to the automotive industry that is open to all technologies, BASF leverages both mechanical and chemical recycling to support the industry in its transformation from a linear to a circular economy.



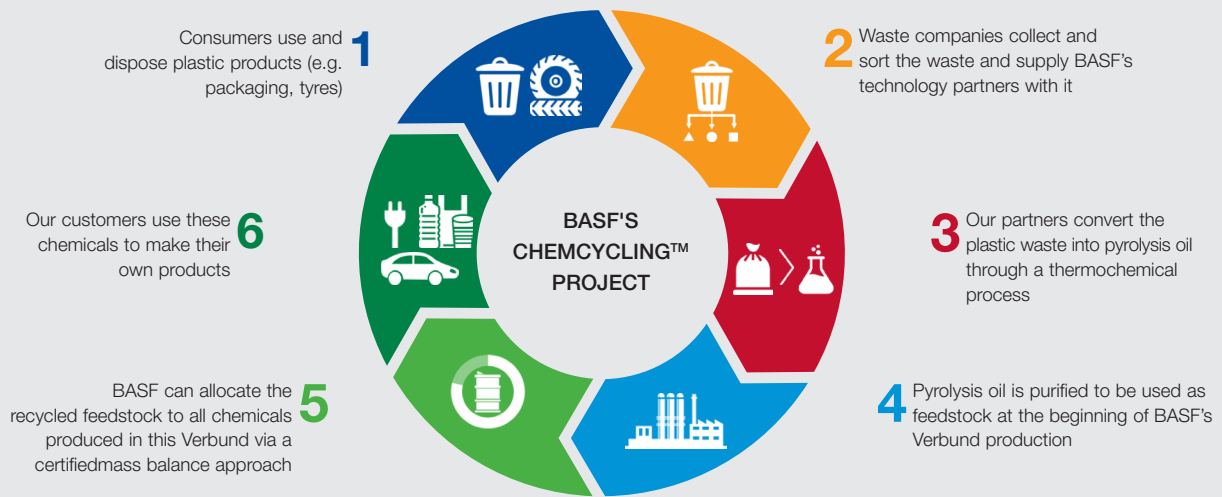
Circular  
feedstocks

New material  
cycles

New business  
models

Plastics do have proven benefits during their use phase – like the prevention of food loss in packaging applications, lightweight construction of vehicles and building insulation. However, plastic waste has become a major global challenge. Globally, around 250 million metric tons of plastic waste are generated each year. Only around 20 percent of this plastic is recycled, thus keeping the material in circulation. More plastic waste should be recycled overall. Solving this challenge and building a more circular economy for plastics requires innovation and joint efforts across the value chain. BASF will contribute to this by developing innovative technologies and product solutions that promote the recycling of plastics.

Complementary, mechanical and chemical recycling can increase the overall recycling rates and contribute to a more circular economy for plastics.



## ChemCycling™ – closing loops with chemical recycling

As customers are making more environmentally conscious purchasing decisions, we want to offer an impactful circular solution which can be applied to a wide range of products. In our chemical recycling project, we replace fossil resources at the beginning of the value chain with recycled feedstock called pyrolysis oil.

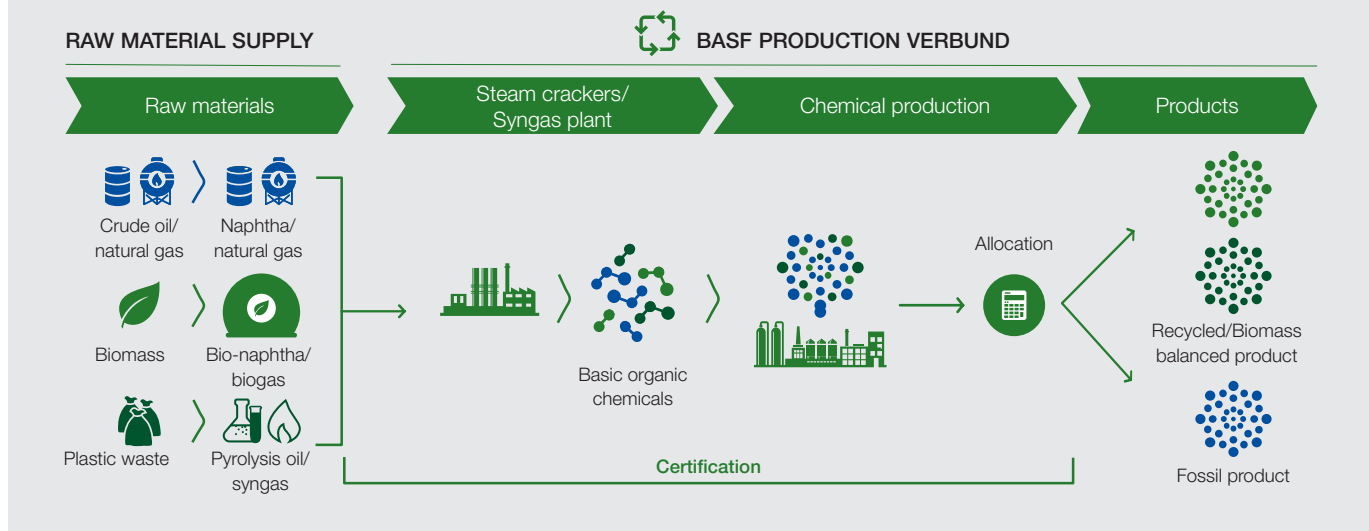
Using a mass balance approach audited by a third party, the share of recycled material is allocated to specific products manufactured in the Verbund. These products are independently certified and have identical properties as those manufactured from fossil feedstock. Customers can therefore process them in the same way as conventionally manufactured products and use them in demanding applications.

The ChemCycling™ project focuses on plastic waste that is not recycled mechanically for technological, economic or ecological reasons. Also, tires that have reached the end of their lifespan can be converted into pyrolysis oil, which is fed into the production of engineering plastics for new automotive parts.

**More Information:**



ChemCycling™



## BASF's biomass balance approach

BASF's biomass balance (BMB) approach contributes to the use of certified renewable raw materials in the company's integrated production system and can be applied to the majority of its product portfolio. In the biomass balance (BMB) approach, certified renewable resources such as bio-naphtha or biomethane that are derived from organic waste, crops or vegetable oils are used to replace an equivalent amount of fossil feedstock in the very first steps of a chemical process. The renewable feedstock is then allocated to specific products by means of an independently certified biomass balance approach. Following this, the bio-based feedstock amount is allocated to specific products sold by means of the certified method. The independent certification confirms that BASF has replaced the required quantities of fossil resources with renewable feedstock for the biomass-balanced product.

This approach enables circular and low-PCF/net-zero products, while maintaining the same quality and performance of the conventional, fossil-based equivalent products.

More Information:



Biomass balance approach



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*We were working together across BASF's business units to achieve the same goal: to make the most attractive car possible.*

– Laurent Vaucenat, BASF



# Co-creation: BASF's material, design and processing expertise

Co-creation is what our hearts beat for. We provide our customers with both material and design expertise and contribute our manufacturing expertise to projects and new developments. The added value we offer lies mostly in the combination of all three areas.

Various BASF facilities are available for our customers:





CITROËN

## Automotive plastics

Alternative powertrains, lightweight construction, emission reduction, design flexibility and driver assistance systems are just some of the trends that are driving both our customers and us. Our extensive portfolio of automotive plastics including engineering plastics and polyurethanes can be used to provide tailor-made polymers to the automotive industry. Plastics offer unlimited potential to engineering. They are special because they contribute significantly to our quality of life wherever they are used. This is particularly true for plastic in cars: With their versatile properties and numerous possible applications, they make today's mobility safer, more efficient, more convenient and more beautiful.

More Information:



Automotive plastics

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## Creation Center

The Creation Centers open the door to the world of BASF's Performance Materials division. In an inspiring atmosphere, customers receive advice on materials along with tangible and digital experience, ideation workshops and advanced development.

The unique set of competencies paired with groundbreaking technology makes the Creation Centers truly special in the chemical industry: BASF's designers, engineers and simulation experts support customers in the early product development phase, with exchange taking place on an equal footing. With the latest visualization tools and simulation techniques as well as a globally networked workshop infrastructure, customer focus and expertise are taken to a new level – for better and faster innovations.

More Information:



Creation Center



## R-M® paint systems

There are two things that count for painters: using the best materials and saving as much time as possible. That's why we judge all our innovations by how they measure up to these standards. The results speak for themselves: easier application, better covering power, higher gloss, faster drying times, outstanding finish and improved environmental compatibility. To help both collision repair centers and their customers get the most out of BASF's high-quality refinish products, we offer an extensive range of technical training courses for Glasurit® and R-M® products.

More Information:



R-M® paint systems

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## Color design

What colors will you see on the road in three to five years? That's the vision the BASF design team offers automotive OEM customers through their expertise in trend research and the design and creation of bold, unique colors. Designing a car color is challenging, as the complex interplay of hue, saturation, texture, surface and metallic or pearlescent effects all have to be taken into account. BASF's color designers continually monitor the trend indicators that determine what vehicles will look like in the future, and create appealing colors for a very demanding market. BASF's world leadership in color keeps automotive designers on the cutting edge, delivering what their customers want and helping them stay ahead of the competition.

More Information:



Color design

## Additive manufacturing

At BASF 3D Printing Solutions GmbH, we provide 3D printing solutions along the entire additive manufacturing value chain under the Forward AM brand. From consultancy and development, through bespoke design, digital simulation and prototype printing, to finishing and exhaustive component testing – we provide you with exactly what your business needs. Whichever material you require for your specific project, Forward AM offers you the world's largest selection of 3D printing materials and service solutions.

More Information:



Additive manufacturing

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## Sculpteo

Sculpteo is one of the leading additive manufacturing production centers with long-term experience across all 3D printing technologies. It supports its customers with part screening and optimization before printing, thus guaranteeing perfect printing results for all manner of applications.

More Information:



Sculpteo

## Highly elastic soft-touch coatings for footwear, furniture and vehicle interiors


Under “Functional Coatings – Haptic”, BASF develops and markets innovative and sustainable coating technologies for highly flexible substrates. Uses include shoes, vehicle interiors and furniture. These technologies set new standards in design opportunities, customization and process optimization, which helps our customers creating innovative and unique products that contribute to more sustainability. Our customers need to protect, functionalize and color flexible substrates, such as foams, and our expertise in paint formulation, application, color development and process integration help them do it. We partner up with our customers, we understand their current and future needs and help them differentiate and optimize themselves.

More Information:



Coatings





Breaking new ground – drawing from a pool of innovations to create new automotive applications – inspires and fulfills us. And, as always, the team is where new solutions arise.

**Let's team up.**

# Driving forward. Together. BASF Automotive Solutions.

The automotive industry is one of BASF's key customer industries. In 2021, BASF's automotive driven sales totaled €18.8 billion – representing approximately 24 % of BASF Group's sales. BASF supplies and develops functional materials and solutions that enable vehicles to be built more efficiently and have a lower environmental impact, whatever powertrain technology they use. BASF's product range includes for example plastics, coatings, catalysts, automotive fluids as well as battery materials. With such an extensive range of products, BASF is the world's leading chemical supplier to the automotive industry. BASF cooperates closely with customers all over the world through a network embracing Europe, Asia-Pacific, North and South America as well as Africa. Further information on BASF's solutions for the automotive industry is available at [automotive.basf.com](https://automotive.basf.com)

More Information:



BASF Automotive  
Solutions



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**Note:**

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