

# TV-Service – Seeing is believing

BASF in motion

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## Full-Year 2020 Reporting

Conference Call, Feb 26, 2021

We work on finding solutions for future challenges in the areas of urban life, nutrition and energy. We show you our top innovations, the latest products, and provide you with an overview of our worldwide Verbund sites.

### Footage material

As the world's leading chemical company, we believe strongly in the emotional appeal of film as a way of making innovations and solutions come alive before the viewer's eyes. Of course, as a journalist you can't be everywhere, but we can help bring you a little closer to our world.

00'04

### (01) Circular Economy – The transformation from linear to circular value creation

Report



The aim of the circular economy is to use fewer resources by efficient processes, waste prevention, re-use, repair, remanufacture and recycling. It focuses primarily on material cycles and relies on energy from renewable sources.

Design for durability ensures that technical products last as long as required, are easily maintained and have high second-hand value. Design for disassembly means that the products and their components can be repaired, remanufactured and recovered as raw material for another manufacturing process.

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## TRANSCRIPT

### **Dr. Christian Lach**

BASF Project ChemCycling

*“The era of linear economy is ending, because we simply cannot afford it anymore.”*

### **Talke Schaffranek**

BASF Circular Economy

*“There is no alternative: if we wish to save resources, we have to change the current system.”*

### **Dr. Alice Glättli**

BASF Strategy & Innovation Performance Chemicals

*“To realize a consistent circular economy requires new approaches. The contribution of chemistry is key here.”*

### **Dr. Kerstin Schierle-Arndt**

BASF Research Inorganic Materials and Synthesis

*“With our strong expertise in chemistry and process development, we are well positioned to develop innovative and sustainable processes.”*

### **Dr. Martin Bruder Müller**

BASF Chairman and CTO

*“The circular economy is a central future topic in society and politics. It is a pillar of the European green deal. I am fully convinced, that it will not be possible in the future without circularity.”*

### **Comment**

*Circular economy is based on products that are as long-lasting as possible and easy to recycle. Raw materials, once used, therefore remain in the cycle for a long time and do not become waste.*

*BASF drives circular economy forward by making the most of the planet's limited resources: it makes greater use of recycled or renewable raw materials, designs new material cycles, and establishes new - including digital - business models together with partners.*

*By 2025, BASF plans to use 250,000 metric tons of recycled raw materials to manufacture customer products. Customers of the company will themselves then become pioneers of the circular economy. BASF scientists are working on a variety of different, innovative processes to achieve this ambitious goal.*

### **Comment**

*In ChemCycling pyrolysis is a process that converts a wide variety of plastic waste into pyrolysis oil which is then fed into BASF's Verbund as a recycled raw material.*

*A further BASF process breaks down the flexible polyurethane from old mattresses and extracts the originally used polyol. This can be used to produce new mattresses.*

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*Modern BASF additives enable the quality of mechanically recycled plastics to remain almost as high as that of first-generation plastics. But not only plastics are recycled.*

*Lithium-ion batteries are central to a rapidly increasing number of modern electric vehicles. Effective recycling of used lithium-ion batteries is of great relevance from both an economic and ecological point of view. BASF and its cooperation partners are working on methods to recycle the valuable metals lithium, cobalt and nickel.*

### **Talke Schaffranek**

BASF Circular Economy

*“We have to shift towards growth models that do not rely on finite resources, but instead turn waste into raw materials.*

*Circular Economy is our opportunity to further develop new business models that decouple our growth from our use of resources. Through the Circular Economy Program, we are setting ourselves quantifiable goals here. By 2025 we intend to use 250,000 tons of recycled raw materials in production. We will double the turnover with circular products by 2030 and we are committed to a program that specifically further develops our circular business models.”*

**03'36**

## **(02) Carbon Management**

Synthesis gas direct conversion - Evaluation of a test catalyst



**Climate protection is firmly embedded in BASF's new corporate strategy. A central goal of this strategy is to achieve CO<sub>2</sub>-neutral growth until 2030. To accomplish this, BASF is continuously optimizing existing processes, gradually replacing fossil fuels with renewable energy sources and developing radically new low-emission production processes. The company is bundling all of this work in an ambitious Carbon Management program.**

New Catalysts for Clean Olefins. Olefins are intermediate substances for the production of cleaning materials, aroma chemicals or superabsorbents. New process technologies and catalysts can reduce the carbon footprint of olefin production by up to 50 percent.

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06'06

### (03) Research on high-performance battery materials

Production of a mini test battery (pouch cell): Assembly



**Electromobility is an important contribution towards addressing global mobility needs – especially in combination with renewable energy. Lithium-ion batteries are used in the majority of today's electric vehicles. BASF is conducting global research on innovative cathode materials, one of the most important components of these batteries.**

Materials for both lithium-ion and all-solid-state batteries. Cathode materials essentially determine efficiency, reliability, costs, durability and the size of the battery. Their properties enable speed, acceleration and power – from compact cars to SUVs, from trucks to buses. BASF's research includes the synthesis of cathode materials (including precursors), characterization of material properties and performance testing. At the same time, experts are working on components for next-generation batteries, such as all-solid-state batteries.

08'14

### (04) Battery recycling – Building a sustainable battery materials value chain

Report



**The development of new European lithium-ion battery recycling capabilities will make it possible to respond to the strong growth of this market in the coming years and to**

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the issue of securing Europe's supply of raw materials required for its energy transition.

Moreover, the virtuous recycling process meets the essential challenges of sustainable performance through its savings on raw materials.

## **TRANSCRIPT**

### **Dr. Kerstin Schierle-Arndt**

BASF Research Inorganic Materials and Synthesis

*“With the advent of electromobility we are experiencing one of the greatest technical and social revolutions ever. The number of electric vehicles on our roads is increasing dramatically.”*

### **Frederik Kuhn**

BASF Global Business Manager Battery Recycling

*“The goal is to decouple ourselves from the consumption of finite resources on this planet. I think lithium-ion batteries are a perfect example here. Recycling will really help us at the end of the day to truly close the loop.”*

### **Tim Ingle**

BASF Global Precious Metals Refining, Chemicals & Battery Recycling

*“Efficient battery recycling is critical for one major reason and this has to do with supply-demand fundamentals. If you look at the supply-side versus the demand side, we will be short on key raw materials like nickel, like lithium. Therefore, we need efficient battery recycling processes to offset those deficits in the future.”*

### **Comment**

*“BASF is simultaneously constructing new plants to manufacture precursors to cathode active materials and cathode active materials for lithium-ion batteries at two European sites. The precursors and cathode active materials that have been developed and refined here in the laboratory in Ludwigshafen will in future be produced on an industrial scale at HarJaValta in Finland and Schwarzheide in Brandenburg.”*

### **Dr. Kerstin Schierle-Arndt**

BASF Research Inorganic Materials and Synthesis

*“We are addressing unmet needs in the battery Recycling Industries, such as high efficiency lithium extraction. We believe our focus on development of new and more sustainable production processes will provide a unique advantage in the recycling value chain. E-mobility will be rendered significantly more sustainable.”*

### **Tim Ingle**

BASF Global Precious Metals Refining, Chemicals & Battery Recycling

*“The shift from a petrol- to an electricity-driven mobility means for me: opportunity. Opportunities for environmentally sustainable solutions as chemistry plays an essential role in lower emissions mobility.”*

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*If you look at the growing population on the planet and the need for resources - resources that are finite- one thing is clear: - We have to use less natural and more recycled resources. If we manage to close the loop via recycling, I believe we can really unlock potential growth.”*

10'40

## (05) Battery recycling closes the loop in electromobility

Footage



**More and more electric cars are registered worldwide every year. At the same time, the raw materials for the batteries are limited and their mining is associated with negative environmental impact.**

BASF researchers at the Ludwigshafen site are therefore developing a new chemical process to recycle the lithium contained in the battery in high purity. This will also avoid waste and reduce the CO2 footprint compared to state-of-the-art recycling processes.

13'28

## (06) BASF Verbund Site Ludwigshafen – Acetylene plant

Daily safety tour I



**Around 20 plants at the Ludwigshafen site use acetylene as a chemical building block and starting material for manufacturing many everyday products, including pharmaceuticals, plastics, solvents, electronic chemicals and highly elastic textile fibers. BASF customers use these products in the automotive, pharma, construction, consumer goods and textile industries.**

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Carsten Triska, shift supervisor, and Christian Ackermann, plant operator, on a safety walk in the acetylene plant. Providing all relevant sections of the plant with WLAN allows the use of mobile devices directly in the plant so that technical information and process data can be accessed on site.

**15'58**

## **(07) BASF Verbund Site Nanjing**

Plant facilities / Impressions



The integrated petrochemical composite at Nanjing is a 50:50 joint venture between BASF and China Petroleum & Chemical Company (Sinopec). It is located close to the Yangtze River in Luhe District of Nanjing Municipality. The Verbund system achieves extremely efficient production and safety by clustering plants and re-using by-products. Within Nanjing Chemical Industry Park (NCIP), BASF-YPC enjoys a favorable environment for further expansion as well as synergies with neighboring enterprises.

The site annually produces three million tons of high-quality chemicals and polymers for the Chinese market, serving rapidly growing demand in multiple industries such as agriculture, construction, electronics, pharmaceutical, automotive or chemical manufacturing.

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