

The world's first carbon fiber smartphone, developed in Germany

- **Ultra-thin and extremely light thanks to Tepex composite from LANXESS**
- **HyRECM Technology unlocks the potential for carbon based composites in connected devices**
- **Monocoque design akin to a Formula 1 race car**
- **Sustainable and recyclable materials**
- **Repair-friendly design made for long service life**

Cologne, March 16, 2021 – A smartphone that sets new standards for lightness, slim design and sustainability is making its debut on the market this March: the Carbon 1 MK II from Berlin-based start-up Carbon Mobile. “Designed and engineered in Germany, the Carbon 1 MK II reignites miniaturization and drives sustainability in connected devices by replacing plastics and aluminum with advanced composite materials for the first time”, says Firas Khalifeh, CEO of Carbon Mobile. The base material for the production of the housing is a thermoplastic composite from the LANXESS Tepex dynalite product range. It is reinforced with fabrics of incredibly fine 1K continuous carbon fiber filaments. “Our composite material, which we developed for extremely lightweight components subjected to considerable mechanical stress, does more than just allow exceptionally thin wall thicknesses. In fact, with its high degree of strength and rigidity, it also helps to make the housing very robust for day-to-day use,” explains Philipp Genders, Tepex expert in application development at LANXESS. “In addition, the matte-black carbon-fibers give the smartphone a truly high-tech look.”

HyRECM Technology – overcoming physical hurdles

Despite their advanced properties for producing robust yet lightweight structures, carbon fibers behave in an electromagnetic shielding manner. This means that they block radio signals, forming a Faraday cage that rather than allowing signals to pass through, instead disperses them around the outer body of the device. Connected

LANXESS AG

Contact:
Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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devices with carbon fiber, for this reason have been viewed as an impossibility by the tech industry.

Following four years of research and development, Carbon Mobile's engineers have developed a revolutionary process to unlock carbon fiber's potential for connected devices. The patented HyRECM (Hybrid Radio Enabled Composite Material) technology fuses carbon fibers together with a complementary composite material capable of RF signal permeation. To further boost the devices connectivity, a unique 3D-printed conductive ink is integrated into the carbon fiber structure. The result is the first "radio enabled" carbon fiber based material. Applied for the first time in the Carbon 1 MK II, the new technology produces a robust carbon fiber-based housing structure that is not only incredibly thin and light, but also made from less than five percent plastic.

Eric Chan from processing partner Modern Composites Ltd said, "LANXESS and their Tepex materials made the perfect partner in the development of HyRECM Technology. Being able to work with a superior material from Germany ensures the best application possible of this revolutionary technology from launch."

Lighter than a bag of potato chips

Following the same construction principle as the load-bearing chassis of a Formula 1 car, the housing is designed as a monocoque, or "single shell". As a result, it makes optimized use of the extreme rigidity of carbon fiber reinforced plastic (CFRP). This contributes significantly to the thin wall thicknesses and low weight of the smartphone and also enables miniaturization. That is because there is no bulky reinforcement taking up space on the inside of the housing. According to Khalifeh, "Our cutting-edge monocoque design enables a device that weighs only 125 grams, a third lighter than conventional smartphones. At just 6.3 millimeters, it is also 25 percent thinner as well."

LANXESS AG

Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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Working toward a world with less electronic waste

Carbon Mobile is committed to sustainable principles. The new smartphone uses only recyclable materials wherever possible. “We want to deliver our contribution to cutting electronic waste and improving sustainability around the world,” says Khalifeh. The composite material used for the housing can also easily be recycled and repurposed for new uses. “Like all products in the Tepex dynalite product line, it can be shredded and then processed on standard injection-molding machines to make high-quality components, either by itself or mixed with suitable new material,” explains Genders. To extend the service life of the smartphone, all its components are designed to be easily replaceable for repair purpose, which also prevents electronic waste from being created.

More information about the new smartphone and about Tepex can be found at www.carbonmobile.com and www.tepex.com respectively.

LANXESS AG

Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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Figure 1



Designed and engineered in Germany, the Carbon 1 MK II from Carbon Mobile is the world's first smartphone produced with advanced carbon fiber technology.

Photo: Carbon Mobile

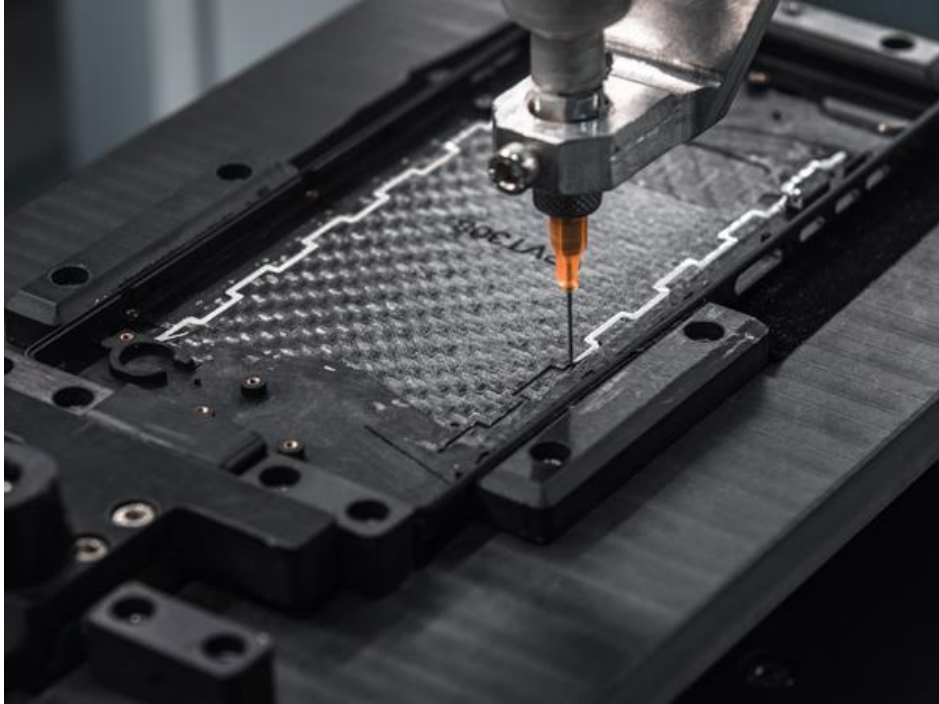
LANXESS AG

Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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Figure 2



The base material for Carbon Mobile's HyRECM Technology is a thermoplastic composite from the LANXESS Tepex dynalite product range. It is reinforced with fabrics of incredibly fine 1K continuous carbon fiber filaments. The patented HyRECM technology fuses carbon fibers together with a complementary composite material capable of RF signal permeation. To further boost the devices connectivity, a unique 3D-printed conductive ink is integrated into the carbon fiber structure.

Photo: Carbon Mobile

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Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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Figure 3



The housing is designed as a monocoque, or “single shell”. As a result, it makes optimized use of the extreme rigidity of the reinforced carbon fiber body.

Photo: Carbon Mobile

LANXESS is a leading specialty chemicals company with sales of EUR 6.1 billion in 2020. The company currently has about 14,300 employees in 33 countries. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World and Europe) and FTSE4Good.

CARBON MOBILE GmbH is a German technology company with a big vision: to be the new European alternative with a diverse portfolio in consumer electronics. In doing so, CARBON MOBILE aims to shake up a sluggish and saturated market that is hungry for innovation and to trigger a rethink towards sustainable production.

LANXESS AG

Contact: Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Köln
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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