



Successful story of Joint development by designer and Covestro: Groundbreaking athletic shoes

The perfect combination of performance, design and sustainability



Groundbreaking athletic shoes

Covestro will unveil groundbreaking material concepts for running and basketball shoes which it has created together with Chinese designer Axis Liu. Both partners collaborated in the development of the customized concept shoes, in their design and technical features.

The shoes satisfy the wishes of athletically active people for a healthy lifestyle, improved performance and individuality. Various material solutions from Covestro are worked in a seamless design, exemplifying the individual benefits of each material: Dispercoll® U PU dispersions solution for adhesives, INSQIN® waterborne polyurethane (PU) waterproof and vapor permeable textile coatings and films made of thermoplastic polyurethane (TPU) and Maezio™ continuous fiber-reinforced thermoplastic composites (CFRTP).

"For me new materials are one of the most powerful driving forces for creative shoe design and for exploring new possibilities," says Axis Liu. "Therefore, I appreciate the know-how of the experts at Covestro and I will continue to benefit from this in the future." The cooperation between Liu and the Covestro team resulted in athletic shoe concepts that set standards in many respects: they are highly sustainable and light, yet extremely durable. They provide increased foot stability and help to compensate for the forces acting on the feet, in order to achieve improved athletic performance.

Running shoe with 3D-printed midsole

For the design of the running shoe, Axis Liu was inspired by a traditional figure from Chinese arts and craft: the "Multilayer Carved Ball" which has a dynamic structure handmade up of several layers.

On the running shoe, the dynamic, extraordinary structure of the midsole was produced by a 3D printer. Because running shoes are often worn outdoors for several hours at a time, it is particularly important for the upper material to be water resistant and breathable. This functionality is achieved on the concept running shoes by using a special INSQIN® coating.

Conventional adhesives based on Dispercoll® U dispersions join together the individual athletic shoe components securely, easily and efficiently. This water-based adhesive technology helps conserve energy and resources. It also contributes to making athletic shoe production more sustainable.

Basketball shoe with good shock absorption

During development of the basketball shoe, however, the designer drew inspiration from the world of toys and the modular construction often found there. Of course, his designs also took into consideration that the feet and bodies of basketball players are strained in different ways than those of runners.

In accordance with the different requirements of both sports, there are also differences in the individual components of the materials used. For example, the midsole of the basketball shoe was made using in-mold foaming and contains expanding TPU (ETPU), which provides good shock absorption and at the same



Footwear designer:	Axis Liu
Coating Raw Material:	Dispercoll® U, Maezio™, INSQIN®, Dureflex®, Platilon®, Desmopan® TPU, Desmodur®
Project:	Groundbreaking athletic shoes

time features particularly high restoring forces. This enhances performance for the jumping and quick acceleration that are common in basketball.

Both shoes use the newly developed Maezio™ carbon fiber-reinforced TPU (CFRTP) to produce the shank, which is very light, but also extremely stiff and torsion resistant, bringing stability and support to the base structure of footwear. This unique material combination offers a high degree of design freedom; in addition, it is recyclable.

Other materials and their function

Apart from that there are many similarities between the two concept athletic shoes:

- The uppers of both shoes contain TPU fibers. These are highly resistant to abrasion and tearing, yet they feel extremely comfortable.
- The Shoe tongue label with Chinese Character "聚" (jù) is applied using a TPU hot-melt film with good printability. "聚" means gather together, it demonstrates how well these films, in the brand name of Dureflex® and Platilon® adhere to textile material with soft surface feel.
- Insoles made of viscoelastic PU foam effectively absorb mechanical loads.

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance, information and recommendations to determine to your own satisfaction whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by Covestro. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent. This presentation may contain forward-looking statements based on current assumptions and forecasts made by Covestro AG. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Covestro's public reports which are available on the Covestro website at www.covestro.com. Covestro assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

Edition: 2021-11 · Order-No.: SC-19 · Printed in China



Covestro (Shanghai) Investment Co., Ltd.
Coatings & Adhesives
No.33 Qin Qiao road,
Shanghai, China 201206

solutions.covestro.com