Press Release

Photonics West: TRUMPF TruHeat VCSEL heating systems make battery production more sustainable

High energy efficiency with TruHeat VCSEL heating modules for battery foil drying // Next generation of innovative VCSEL technology supports lower power densities // Improved battery manufacturing process and product quality with VCSEL heating systems thanks to direct heat transmission // Live demonstration of TruHeat VCSEL heating modules for area heating and e-mobility

Ulm/San Francisco, January 29, 2024 – TRUMPF Photonic Components, a global leader in VCSEL solutions for industrial laser heat treatment, is showcasing its latest TruHeat VCSEL product developments for area heating and e-mobility applications at Photonics West 2024 in San Francisco, USA. The VCSEL-based laser heating systems offer direct, homogeneous and zone-controllable heat treatment for industrial processes. “One example that we will showcase is our next generation of TruHeat VCSEL systems for battery foil drying, offering even higher efficiency and supporting lower power densities,” said Ralph Gudde, Vice President of Marketing and Sales at TRUMPF Photonic Components. “High process quality due to homogeneous heating and illumination zone control, fast processing, a small footprint and lower CO_2 emissions are the benefits that our customers get,” added Gudde.

Novel TruHeat VCSEL laser heating systems for battery foil drying applications

The drying of electrode coatings is a delicate process and consumes most of the energy in Li-ion battery manufacturing due to the use of very large and inefficient convection ovens. Laser drying offers several advantages, like improved energy efficiency, reduced floor space and increased process control. Therefore, TRUMPF developed the TruHeat VCSEL laser heating systems to enable the homogeneous drying of very large surfaces with relatively low power densities. TruHeat VCSEL laser heating systems are based on the latest generation multi-junction VCSEL arrays, and the heating system is optimized for thermal design with highly efficient driver electronics. The wavelength of 980nm is strongly absorbed by all battery electrode materials and therefore supports the high drying efficiency.

The TruHeat VCSEL laser heating systems have a modular design with separate zones. This enables the tight control of individual illumination zones to support not only optimal homogeneity but also the customization of intensity profiles, for example, a lower or higher intensity at the edges of the coating.

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Visit TRUMPF Photonic Components at Photonics West 2024, Booth 833

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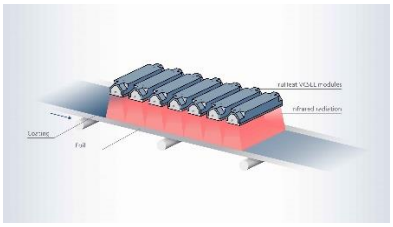
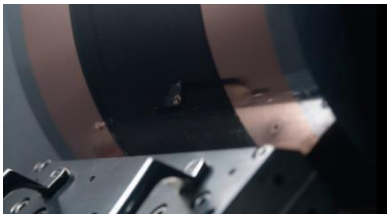
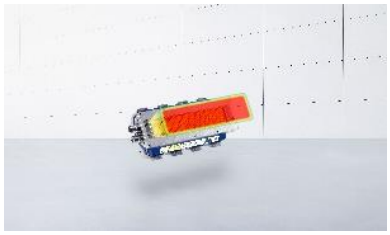


Picture 1: TruHeat VCSEL heating solutions from TRUMPF for Li-battery manufacturing enable more efficient production in various process steps. © TRUMPF

Picture 2: The VCSEL diodes that are used in the VCSEL heating systems are manufactured in the clean room facility at the headquarters of TRUMPF Photonic Components in Ulm. The assembly of the heating modules is done in the Customer Application Center in Aachen. © TRUMPF



Picture 3: At the process step for battery foil drying, VCSEL heating systems efficiently dry the active material on the electrode without nearly any energy loss, thanks to their direct heat treatment. © TRUMPF



Picture 4: High-power infrared VCSEL heating systems provide scalable power and can be regulated precisely. © TRUMPF

About TRUMPF Photonic Components
TRUMPF Photonic Components is a global technology leader, supplying VCSEL and photodiode solutions for consumer electronics, datacom, industrial sensing and heating markets. More than two billion VCSEL chips and photodiodes have been shipped worldwide so far. The employees continue to drive the technological know-how established for over 20 years now in order to maintain its leadership position. The long-established technology was acquired by TRUMPF in 2019. The company has its headquarters in Ulm, Germany, with further sales locations in the Netherlands, China, Korea and the US.

TRUMPF Photonic Components belongs to the TRUMPF Group, a high-technology company that offers production solutions in the machine tool and laser sectors. TRUMPF is the world technological and market leader for machine tools used in flexible sheet metal processing, and also for industrial lasers and metal 3D printing. In 2022/23, the company employed some 18,400 people and generated sales of about 5.4 billion euros. With over 80 companies, the TRUMPF Group is represented in nearly every European country as well as in North America, South America and Asia. The company has production facilities in Germany, France, the United Kingdom, Italy, Austria, Switzerland, Poland, the Czech Republic, the United States, Mexico and China.

For more information about TRUMPF Photonic Components visit: www.trumpf.com/s/VCSEL-solutions

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