Joint Press Release of

PTB - The National Metrology Institute of Germany & LUM GmbH

Support the fight against pandemics with nano metrology

Berlin, 3 August 2021:

In Braunschweig and Berlin, time comes from atomic clocks, lengths are measured far into the nano-world, scientists do research on fundamental questions concerning the physical units, and the employees in the laboratories calibrate measuring instruments, meeting the most demanding requirements. Therefore, the Physikalisch-Technische Bundesanstalt is among the top names in metrology worldwide. As Germany's national metrology institute, PTB is Germany's highest authority when it comes to correct and reliable measurements. It is the supreme technical authority of the Federal Ministry for Economic Affairs and Energy (BMWi) and employs a total of approx. 1900 staff members.

LUM GmbH is a leading international provider of innovative measurement technology for particle characterization in the nano and micro range, for dispersion analysis and for materials testing, headquartered in Berlin. The company has a branch in France and three subsidiaries, in the USA, China and Japan. LUM GmbH consists of a highly qualified, multidisciplinary team of scientists, technicians and engineers. Scientific and measurement-technology expertise has been obtained for decades in:

- Particle characterization
- Analysis of suspensions and emulsions, including stability evaluation
- Determination of adhesive and bonding and strengths
- Quality assurance and process optimization.

This knowledge and its continuous extension form the basis for customer-oriented problem solving, product developments and services for our national and international customers, working in larger industrial, food, cosmetics, pharmaceutical enterprises and increasingly in the academic sector.

Nanotechnology is finding its way into various areas of daily life, as particles in the size range below 100 nm are sometimes characterized by new optical, electrical or magnetic properties. This is used e.g. for quantum dots, sun creams, functional inks or in medicine. With the use of nanoparticles, the challenge of their characterization in product development, production quality control and, last but not least, for the risk assessment of the products increases. In addition to determining the size, recording the number of nanoparticles plays a decisive and increasing role here. The method of choice is still electron microscopy, which, however, requires a vacuum for the imaging of the particles and is very time-consuming.

In cooperation with PTB, LUM GmbH has developed an analytical measurement system (LUMiSpoc®) for the multidimensional characterization of nanoparticles as part of a technology transfer project supported by the BMWi. LUM has delivered the LUMiSpoc for the first time in 2021.

The LUMiSpoc is a sophisticated single particle light scattering photometer that determines the particle size distribution and particle concentration of nano and microparticles in suspensions and emulsions with an unprecedented resolution and a dynamic range from 40 nm to 10 µm. Up to 10,000 particles can be analyzed per second. Based on SPLS-Technology® (Single Particle Light-Scattering), the

LUMiSpoc measures the intensity of the light that is scattered in different directions by each individual nano- and microparticle when they pass through a strongly focused laser beam with a tiny cross-section. Particles are separated by hydrodynamic focusing of the sample flow. The volume-calibrated sample flow enables precise measurement of the particle concentration.

The LUMiSpoc analyzes very broad, multimodal or polydisperse real particle suspensions over several orders of magnitude without any hardware changes and determines the smallest differences in size down to the nanometer range, even for very high initial concentrations.

The first devices have already been handed over to a global pharmaceutical company in the EU for the development of a corona vaccine and a well-known national academic institution.

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