PRESS RELEASE

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AIXTRON enables the next step in the GIMMIK research project for more energy efficiency

Specific CVD system ready for Graphene processing on 200mm wafers / Production of layers evaluated under industrial conditions

Herzogenrath/Germany, December 22, 2020 – The newly developed CVD tool for the production of large-area graphene layers as part of the GIMMIK research project has gone into operation. AIXTRON SE (FSE: AIXA), one of the world's leading suppliers of deposition equipment to the semiconductor industry, has developed, built and installed a new, specific industrial grade reactor for the Graphene and hexagonal Boron Nitride (hBN) processing on 200 mm epi-wafers.

hBN is a boron-nitrogen compound with a hexagonal crystal structure. The reactor specially developed for this application builds on the existing knowledge of showerhead based CVD systems. It is able to achieve the tight product specification needed for a successful industrial application of these materials.

The GIMMIK research project (**G**raphene processi**n**g on 200**mm** wafers for m**ic**roelectronic applications) should lead to the industrial application of graphene and hBN. Therefore, the production of graphene layers is to be evaluated under industrial conditions. The consortium partners are developing methods to ensure a consistently high graphene and hBN quality as a basis for production suitability for deposition and integration processes.

AIXTRON starts now with the production of GR/hBN layers for the consortium partners and the optimization of the layers and processes. Participants in the project are the research center IHP – Leibniz Institute for Innovative Microelectronics, the semiconductor industry companies Infineon, Protemics and LayTec, and RWTH Aachen University. AIXTRON is the project coordinator.

The goal: Supporting the industrial application of GR/hBN

"After installation and test of the new CVD system we have taken a decisive step forward in our GIMMIK project. Because we now have the specific system and thus the instrument with which we can start our work on developing of processes for the production of layers with the necessary wafer size and quality. This is extremely important for applications in the fast growing markets of microelectronics and sensor technology", says Professor Dr. Michael Heuken, Vice President Corporate Research & Development of AIXTRON SE and Professor at

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RWTH Aachen University. "And now we are ready for the next, exciting steps towards new devices and new applications as well as production in this important research project".

The new material graphene and hBN could be a decisive driver in the development of innovative products and in the creation of necessary energy efficiency in view of the climate crisis. A wide range of applications such as transistors, sensors, photonic devices are possible. Due to its extremely high charge carrier mobility, graphene opens up the possibility of manufacturing RF (radio frequency) transistors with cut-off frequencies in the THz range. Numerous applications in energy-efficient high-frequency electronics are conceivable for them. "Graphene and CVD grown hBN could thus make a significant contribution to one of the major challenges, namely the need for significantly higher energy efficiency," emphasizes Prof. Dr. Michael Heuken.

High potential also for improving energy efficiency

In the automotive sector, graphene can not only be used for sensors for vehicle safety. Mobile applications (smartphones, watches) are playing also an increasingly important role. Graphene is an important building block for achieving competitive advantages with products such as magnetic sensors, microphone pressure sensors or optical sensors in which graphene can be used as a functional and market-differentiating component.

Last but not least, there are new combinations of wafer-level based graphene and silicon photonic devices possible. They would allow Graphene-based modulators with high thermal stability and significantly reduced device footprint and also photodetectors that offer superior performance to currently available photonic integrated components (silicon (Si) semiconductors and III/V semiconductors).

Further information about GIMMIK here.

The project GIMMIK is funded by the Federal Ministry of Education and Research (BMBF) (funding number: 03XP0210A)

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AIXTRON SE is a leading provider of deposition equipment to the semiconductor industry. The Company was founded in 1983 and is headquartered in Herzogenrath (near Aachen), Germany, with subsidiaries and sales offices in Asia, United States and in Europe. AIXTRON's technology solutions are used by a diverse range of customers worldwide to build advanced components for electronic and opto-electronic applications based on compound, or organic semiconductor materials. Such components are used in a broad range of innovative applications, technologies and industries. These include LED applications, display technologies, data storage, data transmission, energy management and conversion, communication, signaling and lighting as well as a range of other leading-edge technologies.

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