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VON ARDENNE EQUIPS NANO LABORATORY OF KIEL UNIVERSITY WITH A CLUSTER SYSTEM FOR RESEARCHING MAGNETIC FIELD SENSORS FOR MEDICAL DIAGNOSTICS

VON ARDENNE has received an order from the Christian-Albrechts-Universität Kiel in Germany for the delivery of a Cluster Sputter System CS400S. The system will be part of the competence center for nanosystem technology, a project funded by the European Structural and Investment Funds. Apart from that, it will be used by the special research field (SRF 1261) "Magnetolectric Sensors: From Composite Materials to Biomagnetic Diagnostics", which was granted to the Kiel University in May 2016 by the German Research Foundation (DFG).

The main aim of these facilities is to develop measuring methods for the recording of brain and heart waves and their magnetic fields. Due to their considerably higher spatial resolution, these non-contact methods are suited to be an alternative to or to complement established methods such as the electroencephalography (EEG) or the electrocardiography (ECG). In their recent research, the SRF team, which is headed by Professor Eckhard Quandt, had already improved the limit of detection for biomagnetic signals of the brain and the heart up to the Picotesla range. Thanks to that, it seems that these signals will be considerably easier to be measured in the future by further sensor improvements.

Up to now, magnetic measurements of biomagnetic signals can only be made with considerable technological efforts, which are necessary to block off external magnetic fields and to cool the currently used sensors. At the special research field, scientists are now working on novel sensors that will not require these measures and that will reduce the costs for the respective diagnostic tools substantially.

The VON ARDENNE Cluster Sputter System CS400S provided by VON ARDENNE, a German company specialized in high-tech coating systems, will be at the heart of the sensor development efforts. It will be used to deposit magnetolectric layer systems* on 8-inch substrates such as those used for manufacturing these novel magnetic field sensors. In the long run, the new cluster system shall replace the VON ARDENNE CS730S, which has been successfully used by the Kiel nano laboratory from the beginning to develop the currently used layer systems.

The CS400S will feature three process chambers for confocal and parallel sputtering, a central handling unit and a magazine load lock chamber. Apart from a number of standardized components, it will also be equipped with a new functional unit, with which a magnet BIAS can be created. This BIAS is crucial for the creation of magnetolectric layer systems, which are the basis for magnetic field sensors. These sensors shall be used for biomagnetic diagnostics to localize neuronal sources of brain activity.

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“We consider it a great success to have received this order and to be able to make a vital contribution to the development of these new diagnostic methods with our machine”, said Hans-Christian Hecht, the CTO of VON ARDENNE. “Thereby, we carry on the long tradition of our company and the former Manfred von Ardenne Research Institute in medical engineering. Beyond that, by cooperating with the experts of the Kiel University, we will be able to gain some valuable experience with this new coating method, which will be incorporated into the development of new applications. By combining magnetron sputtering with an overlapping magnet BIAS, the growth and the properties of layers can be specifically influenced, which makes this method interesting for several other fields of application.”

* Magnetolectric layer systems are the basis for sensors that transform an external magnetic field into an electric current that can be measured directly. The layer system is based on a combination of piezoelectric and magneto-strictive materials (length of the material changes when a magnetic field is applied).

ABOUT VON ARDENNE GMBH

VON ARDENNE develops and manufactures equipment for industrial coatings on materials such as glass, wafers, metal strip and polymer films. These coatings give the surfaces new functional properties and can be between one nanometer and a few micrometers thin, depending on the application. The coated materials are the basis for products such as architectural glass, solar modules or touch screens.

VON ARDENNE is a leading provider of architectural glass coating equipment and coating systems for thin-film photovoltaics. The family-owned company with subsidiaries in China, Japan, Malaysia and the USA relies on customer proximity in order to offer ideal on-site service. VON ARDENNE equipment is in operation in more than 50 countries around the world.

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