Belgium's Umicore opens US germanium wafer plant, bolstering 6-inch diameter capability

Only Ge wafer maker with high-volume production on two continents

Materials technology firm Umicore of Brussels, Belgium has officially opened its new germanium (Ge) wafer production facility at its site in Quapaw, OK, USA, which is on the same campus as the firm's germanium optics and high-purity chemicals operation for the US market.

The Grand Opening was held in the presence of almost 100 guests including CEO Marc Grynberg and Oklahoma State's Secretary of Commerce Natalie Shirley. Umicore says that it has invested several tens of millions of dollars in the 40,000 square-foot facility.

Two years after the ground-breaking in October 2008, the completion of installation work and testing at the new facility makes Umicore the only Ge wafer manufacturer with high-volume production facilities on two continents (North America and Europe). The firm says that this enables it to respond flexibly to demand for Ge wafers in a growing market.

Umicore's CEO Marc Grynberg and Oklahoma's Secretary of Commerce Natalie Shirley at the Grand Opening of the Quapaw wafer plant.

The production operation is modeled on Umicore's Olen facility in Belgium, which has supplied millions of substrates for space and terrestrial photovoltaic applications. The firm says that its new Quapaw plant embodies proven equipment and an advanced product tracking system.

"Global demand for Ge wafers is set to rise significantly in the years to come," says Carl Quaeyhaegens, general manager at Umicore's Substrates business line. "This is why we pursue an ambitious production expansion plan. With our production facilities in the United States and Belgium, we are now in an ideal position in terms of quantity and quality to meet rising demand," he adds. "In addition, Quapaw will enable us to strengthen our global lead in 6-inch Ge wafers."

www.substrates.umicore.com

Patent granted for NCSU's buffer-free GaN-on-silicon

Jay Narayan, the John C. Fan Distinguished Chair professor of Materials Science and Engineering at North Carolina State University (NCSU), and former NCSU Ph.D. student Thomas Rawdanowicz have just been granted a patent for technology that allows gallium nitride (GaN) sensors and devices to be integrated directly into silicon-based integrated circuits without any buffer layers for the first time, it is claimed (US Patent 20050124161 'Growth and integration of epitaxial gallium nitride films with silicon-based devices', originally filed in 2004). "This enables the development of high-power (high-voltage and high-current) devices that are critical for the development of energy distribution devices, such as smart grid technology and high-frequency military communications," says Narayan.

"This integration of GaN on the silicon platform without any buffer layers has enabled the creation of multi-functional smart sensors, high-electron-mobility transistors, high-power devices, and high-voltage switches for smart grids which impact our energy and environmental future," reckons Narayan.

Integrating GaN into silicon chips also makes a broader range of radio frequencies available, which will enable the development of advanced communication technologies. "These devices stand to meet the challenges of high-power, high-frequency and high bandwidth needs for advanced consumer applications and military satellite communications," Narayan says.

"Direct integration of devices based on different types of semiconductors onto silicon chips is of considerable interest because it can enable different functionalities, such as lasers or higher-performance transistors," comments Dr Pradeep Fulay of the US National Science Foundation (NSF), which funded the research. "Narayan has used a special process that allows integration of semiconducting materials like GaN on the silicon so as to create hybrid-type computer chips. This research will likely lead to transistors with far superior power and performance sought for many commercial and military communication applications," he reckons.

The research was originally published in 'Epitaxial GaN on Si(111): Process control of SiNx interlayer formation' Applied Physics Letters 85(1), 133 (2004). The NSF is currently funding additional research by Narayan in this area. A US-based corporation is currently in the process of licensing the technology.

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