ПРЕСС-РЕЛИЗ

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Production of Epitaxial Wafers for High-Speed Optical Components Opens in St. Petersburg

A factory has been launched in St. Petersburg where specialists will produce epitaxial wafers for high-speed optical components. RUSNANO and URALSIB Financial Corporation cofinanced the project. The technology for production of the epitaxial wafers was developed by a team of researchers from the Ioffe Physical Technical Institute in collaboration with German company VI Systems GmbH. This technology has no rival anywhere in the world.

Total investment in the project was 1.1 billion rubles of which RUSNANO cofinanced 770 million rubles. Project company Connector Optics expects that its share of the world's market will reach five percent in 2015 and that income from sales that year will be 2.4 billion rubles.

RUSNANO Managing Director **Konstantin Demetriu**, head of the URALSIB Private Equity Fund **Alexander Rakhlevsky**, and Connector Optics General Director **Alexander Ukhin** took part in the ceremony to mark the start of production.

Epitaxial wafers are used in optoelectronic and microwave instruments of various purposes, including vertical-cavity surface-emitting lasers, photodiodes, microwave transistors, and diodes. The VCSELs and photodiodes based on epitaxial wafers grown by Connector Optics are intended for next generation optical interconnections: USB, HDMI, DisplayPort high resolution monitor output interface, active optical cables for Infiniband computer buses, and devices complying with Fiber Channel IEEE standard.

The newly launched production complex is situated in premises of 1,000 square meters of which clean rooms take up 300 square meters. The complex uses an advanced industrial molecular beam epitaxy unit and equipment for a non-destructive diagnostics of epitaxial heterostructures. Design capacity of current production exceeds 2,000 wafers per year. These wafers could be used to manufacture several million vertical-cavity surface-emitting lasers and photodiodes—a sufficient number of optical components for several state-of-the-art supercomputers.

"The chief advantage of the optical components produced by Connector Optics is the speed at which they transmit data. Production technology and the structure of the VSCELs make it possible to transmit data at up to 40 Gbit/s, 2.5 times faster than any competing device currently offered in the global market. Today this

company doesn't have competitors in price to transmission speed ratio. Therefore, in the near term we expect to take a large share, not only in the Russian market but also in international markets," said RUSNANO Managing Director **Konstantin Demetriu.**

"High-technology venture projects based on domestic advances are rare in the Russian market. It's likely that the Connector Optics project will take a strong position in the sector," said **Alexander Rakhlevsky**, head of URALSIB Financial Corporation's Private Equity Fund.

"Having technology and production of high-speed optical components in Russia will enable us to meet demand in the domestic market and promote a Russian brand among leading global manufactures of high-speed opticals," said Connector Optics General Director **Alexander Ukhin**.

RUSNANO *was founded in March 2011 as an open joint stock company through reorganization of state corporation Russian Corporation of Nanotechnologies. RUSNANO's mission is to develop the Russian nanotechnology industry through co-investment in nanotechnology projects with substantial economic potential or social benefit. The Government of the Russian Federation owns 100 percent of the shares in RUSNANO.* ***Anatoly Chubais*** *is CEO and chairman of the Executive Board of RUSNANO.*

Work to establish nanotechnology infrastructure and training for nanotechnology specialists, formerly conducted by the Russian Corporation of Nanotechnologies, has been entrusted to the Fund for Infrastructure and Educational Programs, a non-commercial fund also established through reorganization of the Russian Corporation of Nanotechnologies. For more information, please visit the company's website at www.rusnano.com.

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URALSIB Financial Corporation *is one of the largest Russian financial groups. It offers the entire spectrum of financial services, including retail and corporate banking products, investment banking services, leasing, brokerage and custodial services, asset management, and philanthropy. As of January 10, 2011, URALSIB had 456 offices in Russia.*

URALSIB Financial Corporation is at the top of the annual ranking of Leaders in Corporate Philanthropy, conducted by the newspaper Vedomosti, PricewaterhouseCoopers, and Donors Forum, a nonprofit partnership of grantmaking

organizations. Each year the corporation realizes about 130 social and charitable projects benefitting more than 50,000 children.

BANK URALSIB is a leading Russian bank. It offers a broad selection of banking products and services to retail and corporate clients. The bank holds credit ratings from international rating agencies: Fitch Ratings—'BB', Standard&Poor's—'B+', and Moody's Investors Service—'Ba3'.

According to information from RBC Rating, a Russian rating agency, at the end of the first half on 2011, BANK URALSIB stood in 12th place in net worth among Russian banks, second place in crediting small and mid-sized businesses, fifth place in its rating of best retail banks, and sixth place by number of proprietary ATMs. BANK URALSIB was among the top 15 banks in Russia by size of credit and deposit portfolios for legal entities and individuals.

URALSIB Financial Corporation *established its* ***Private Equity Fund*** *in 2008. The fund invests in attractive market assets, participates in debt restructuring projects, and manages the non-core assets of URALSIB Financial Corporation. In 2010 Alexander Rakhlevsky was appointed head of the Private Equity Fund. For more information on the fund, please visit its website at* www.pe.uralsib.com/eng/about/index.wbp

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History of Connector Optics

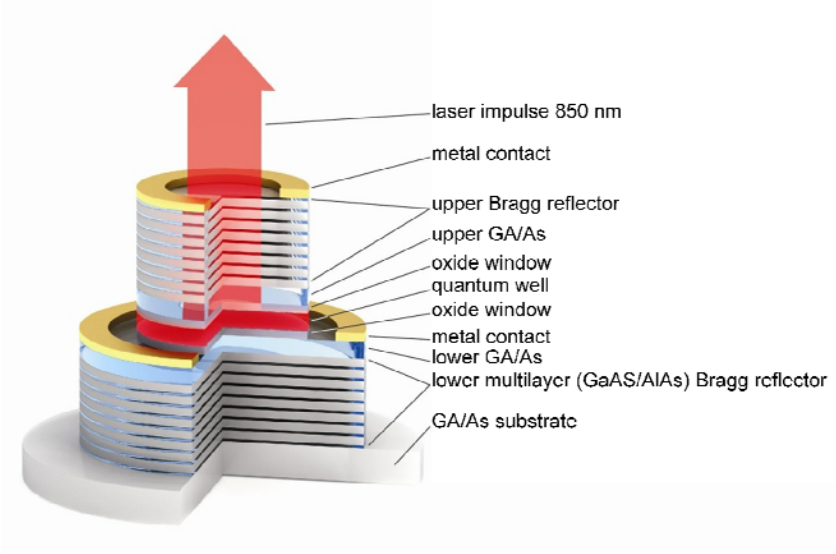
The study of semiconductor heterostructures for high-speed optoelectronics began in the 1960s at the Ioffe Physical Technical Institute under the direction of Zhores Alferov. For their working in developing this area, Professor Alferov and Herbert Kroemer (USA) were awarded the Nobel Prize in Physics in 2000.

In 2009 a team of scientists from the Ioffe Physical Technical Institute with considerable practical experience in the semiconductor industry and German company VI Systems GmbH submitted a proposal to RUSNANO to establish in St. Petersburg cutting-edge production of vertical-cavity surface-emitting lasers and photodiodes for high-speed data transmission. Thus, heterostructure technology returned to Russia in a new role and became the basis for advanced production of these special purpose optical components.

Technical information

Epitaxial heterostructures are prepared using Industrial technology for molecular beam epitaxy on a substrate of gallium arsenide and indium phosphide. Growth takes place under high vacuum conditions. The flow of source material travels in the form of molecules beamed onto the substrate, the target on which deposition of the material occurs. In this fashion, with precise doses of material flowing from each source, it is possible to obtain semiconductor material of varying compositions.

Modern variants in construction of vertical-cavity surface-emitting lasers use vertical optical microresonators with mirrors at the base of interstratified layers of semiconductor materials of differing formulations (for example, solid solutions of aluminum gallium arsenide where the aluminum content varies). As a rule, one, or several, quantum wells is used as the active (light-emitting) area.



Among advantages of VCSEL in comparison with traditional lasers are small angular divergence, symmetrical directional pattern of the output of light emission, temperature and radiation stability, batch-mode processing, and the ability to test instruments directly on the wafer. VIL planar technology facilitates formation of integrated linear arrays and two-dimensional matrices with a large number of individually addressed emitters.

In practice, to achieve high-speed response, it is essential not only to optimize parameters in the active area and epitaxial heterostructures overall but also in the chip pattern of the VCSEL. The technology belonging to Connector Optics

makes it possible to realize VCSEL of the spectral range of 850 nm with record-setting high speed—to 40 Gbit/s in a regime of direct current modulation. At present only a few leading companies produce VCSEL providing data transmission of 10 Gbit/s, and they do so largely for their own transmitters. Meanwhile, in accordance with plans for development of the Infiniband standard, the speed of data transmission in next generation cables must reach 26 Gbit/s, while the new interface for USB 3.0 will work at 5 Gbit/s with fiber optic hook-up capability. The protocol for data transmission will make it possible to reach 25 Gbit/s in the near future. Clearly, there is demand in the market for VCSEL that provides data transmission at 25 Gbit/s and greater.