

LASER CRYSTAL

VLOC Incorporated of New Port Richey, Florida, has carved out a unique place in the laser industry. A diversity of product coupled with vertical integration of the manufacturing process has made this possible. Exploration by the company in certain laser materials was kick-started by NASA Small Business Innovation Research (SBIR) awards.

Langley Research Center supported VLOC through an SBIR award to carry out crystal growth and materials characterization research. That support led to an exquisite laser crystal, now being commercialized with the firm's own internal funding.

VLOC is a subsidiary of II-VI Incorporated of Saxonburg, Pennsylvania. NASA SBIR work was initiated through Lightning Optical Corporation, based at Tarpon Springs, Florida, which was acquired by II-VI Incorporated in 1996, and was merged with II-VI's Virgo Optics facility in July 1997 to form VLOC, Incorporated.

VLOC grows and manufactures oxide and fluoride laser grain crystals as well as various nonlinear materials. A customer catalog offers specialty optics, cavities, and components for lasers that operate from the ultraviolet to the near infrared region of the spectrum.

The ultimate result of the Langley-funded SBIR work is the commercial availability in the marketplace of a reliable source of high-quality, damage resistant laser material, primarily for diode-pumping applications: Chromium-doped Lithium Strontium-Aluminum-Fluoride (Cr:LiSAF) crystals.

This laser material was sought by NASA for employment in a solid-state diode pumped laser that would be extremely compact. This first Cr-activated, directly diode pumped laser was required to be broadly tunable in the near infrared region of the spectrum, highly efficient, yet straightforward in its design. LiSAF is well-suited for the generation and amplification of pulses as short as a few tens of femtoseconds.

High performance Cr:LiSAF materials can feature several different high reflector, anti-reflection and dichroic optical coatings, depending on the type of laser that uses the laser crystal.

Several immediate tasks for Cr:LiSAF crystals have been projected. Commercial interest in remote sensing of the atmosphere, to determine water vapor, as well as pollution monitoring, and noninvasive surgical techniques, indicates a multitude of applications and markets exist for a device incorporating VLOC-grown and fabricated Cr:LiSAF. The company is interacting with four laser companies to provide Cr:LiSAF crystals for future commercial sales.

VLOC anticipates annual sales of the LiSAF product lines to exceed a quarter million dollars in the first year following completion of the Langley Research Center-awarded Phase II SBIR funding.

As a subsidiary of II-VI Incorporated, VLOC manufactures virtually all of the optical components required for solid-state lasers which includes optics, glass cavities, and crystals. The quality of crystal products is a result of VLOC's tight control of the process, from starting materials through crystal growth, fabrication, coating, and verification. VLOC uses state-of-the-art coating techniques, such as ion-assisted ion beam sputtering, which stands up to the rigors of high power laser use on a production basis. Most of the company's new, purpose-built facilities on the Gulf Coast of Florida are dedicated to manufacturing.

In 1997, revenues and earnings growth set record levels at II-VI, explains Francis Kramer, President and Chief Operating Officer of the company. "Expanded use of lasers and the continued development of radiation detection technology increased and diversified the markets we serve," he says.

II-VI Incorporated and VLOC are on a pathway for continued growth and expansion. From manufacturing to health care to automotive industries, a promising future is anticipated in fabricating specialty materials that enable lasers and other devices to operate at peak efficiency. "As we move forward, our focus remains on expanding our core capabilities while identifying opportunities for acquiring new businesses and technologies to continue our leadership position," Kramer explains.



Custom manufacturing of laser crystals and optical components satisfy expanding industrial, medical, environmental, and research markets.