

As valuable as Gold



Schott ML has opened a calcium fluoride crystal factory with the world's largest production capacity.

The capacity of microchips doubles approximately every 18 months. This rapid development can be attributed above all to advances in optical lithography, the process used to transfer the 'blueprints' for transistor and memory units onto silicon wafers. For the manufacture of the next generation of chips, lasers are being used with a wavelength of 157 nm (1 nanometer = 1 millionth of a millimeter). Calcium fluoride is the most important optical material because of its ability to transmit this light without being damaged by it.

Dimensions not achieved before

Schott ML has opened the facilities in Jena, creating the world's biggest production capacity for these coveted crystals. The new factory is part of a 50 million Euro investment package intended to give a powerful boost to the expansion of Schott's microlithography activities in the coming years.

In its new factory located in Jena, Schott ML manufactures calcium fluoride crystals with a diameter of up to 350 mm and a thickness of over 150 mm in the best quality ever reached.

The crystal growing units operate under high vacuum following a sophisticated temperature program that permits the crystals to grow at an extremely slow but undisturbed rate of a few centimeters per day. After eight weeks the crystals, which now weigh around 100 kilograms, are ready. The disks are up to 350 millimeters (14 inches) in diameter and more than 150 millimeters (6 inches) thick. Despite their considerable size, which represents dimensions not previously achieved, their atomic structure is completely uniform, which explains the name monocrystal. This high-tech material, which is as expensive as pure gold, is used to manufacture lenses required for wafer steppers.

The semiconductor industry estimates that annual demand for calcium fluoride will be 50 metric tonnes once the 157 nm technology is introduced around 2003.

Complete supplier for high-tech optical materials

With the new factory, Schott ML is the first supplier that can cover the entire spectrum of high-tech optical materials for current and future applications in microlithography. This includes not only calcium fluoride but also optical glass and fused silica. Other items in the range are optical components for excimer lasers, super polished substrates and mask blanks for photomasks plus extremely light "Zerodur" glass ceramic structure parts for wafer and mask mountings ■