EUV mask-related inspection systems

Lineup

We embarked on the development of high-performance inspection systems for EUV lithography early on and have diligently devoted time and effort to acquire technical expertise in the area of EUV mask inspection. We have 6 products in our lineup today to meet customer needs.

Leading-edge semiconductor devices and EUV

Semiconductor devices need to introduce finer and more complex IC designs to enjoy the merit of scaling and achieve better performance. Major device manufacturers have started using EUV lithography in volume production to print finer patterns on semiconductor chips since 2019. EUV lithography is a critical technology for manufacturing leading-edge semiconductors to enable the 5th generation mobile communication (5G), artificial intelligence (AI) and other innovations. The application of EUV lithography to semiconductor production is expected to grow rapidly.

Mobile • 5G/IoT

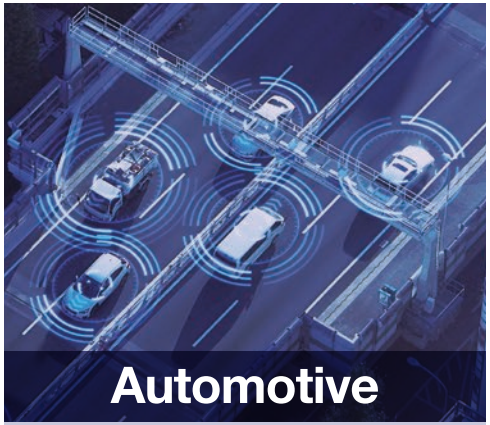
Pursuit of convenience

Data Center

Processing large volumes of data

AI

Big data and image analysis



Automotive

Widespread use of electric vehicles and autonomous driving

Growing demand for semiconductor devices

- **Logic devices** for calculation and image processing
- **Memories** for data storage
- **Image sensors** for light sensing and imaging
- **Power devices** for optimal power conversion and control

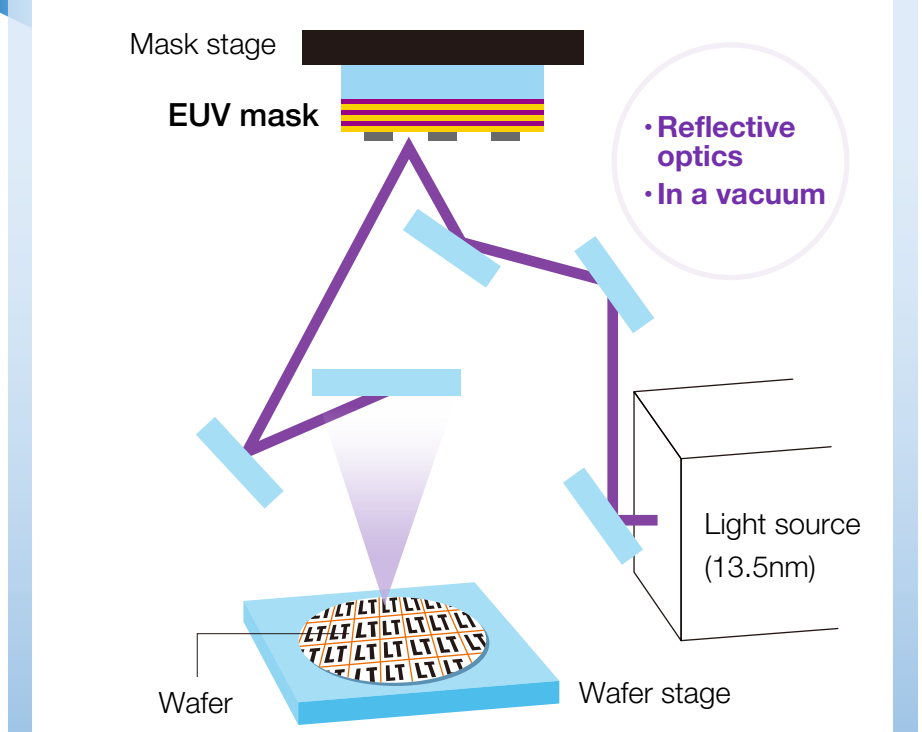
As semiconductor devices attain a higher level of scaling and performance, inspection with better tools will be required.

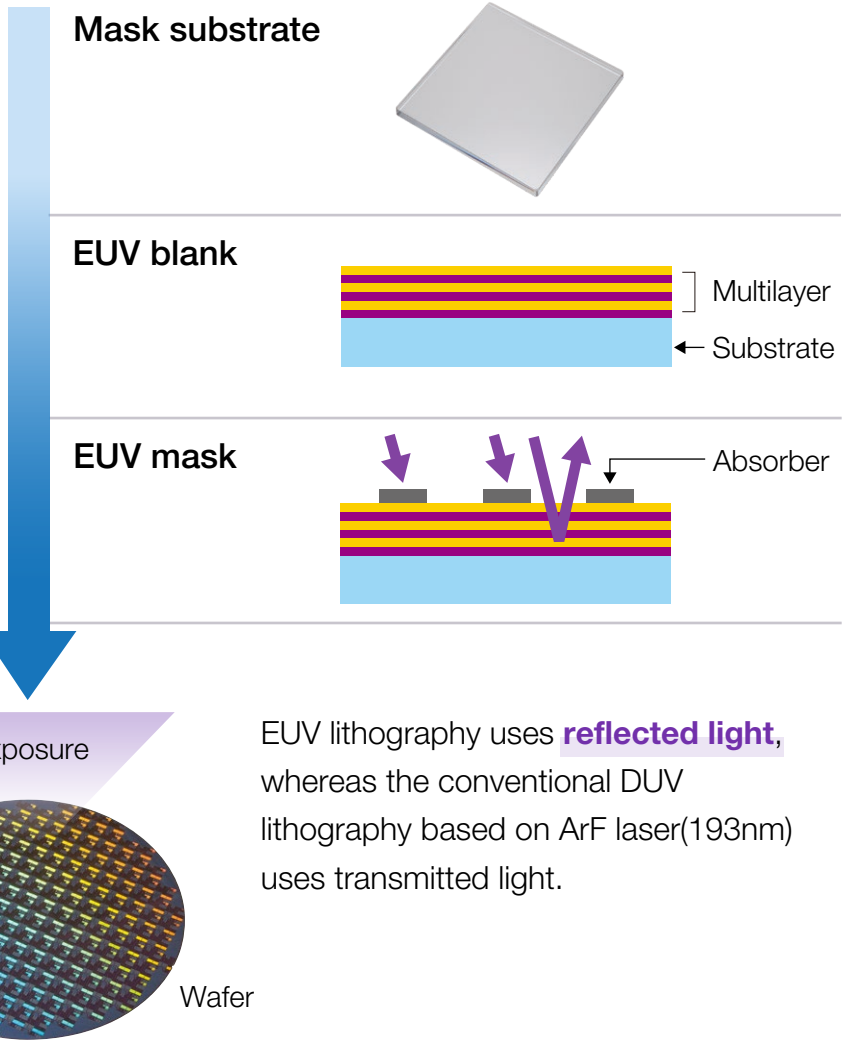
What is EUV lithography?

EUV lithography is a type of lithography using the extreme ultraviolet (EUV) range of light. It is capable of creating much finer IC patterns than previously possible because its wavelength (13.5nm) is much shorter than that of the ArF excimer laser (193nm) used in conventional DUV lithography.

Lithography is a technique to form patterns (e.g., line and space) on silicon wafers, which are eventually diced to make semiconductor chips. In lithography, wafers are exposed to light projected via a photomask, which is a plate with the blueprint of a pattern, after a photosensitive chemical called photoresist is applied on them. The pattern appears on the exposed wafers when the photoresist is removed from them. Multiple photomasks with different patterns are used to form an integrated circuit.

EUV lithography system





EUV lithography uses **reflected light**, whereas the conventional DUV lithography based on ArF laser(193nm) uses transmitted light.

EUV: Extreme ultraviolet, which is a range of the wavelengths of light around 13.5nm, less than 1/10 the wavelength used in conventional lithography

EUV lithography: Leading-edge lithography using EUV light to enable the further scaling of semiconductor devices to achieve the design nodes of 5nm and beyond

Lineup of EUV-related systems from Lasertec

EUV lithography

Blank manufacturing → **Mask manufacturing (Mask shop)** → **Semiconductor device production (Wafer fab)**

MAGICS M9650

Mask Blanks Inspection and Review System

Inspection of EUV mask blanks, optical mask blanks, and substrates

EUV mask substrate inspection

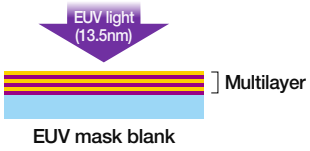
ABICS E120

World's first 2017 Ten Best New Products Award

EUV Mask Blanks Inspection and Review System

Adopting the 13.5nm light of EUV lithography for inspection to enable the detection of defects unique to EUV mask blanks

EUV mask blank inspection

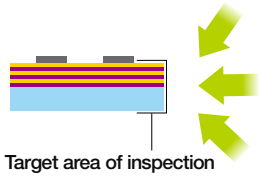


MZ100

Mask Edge Inspection System

Inspection, measurement, and review of the mask edge of EUV masks and DUV masks

EUV mask edge inspection



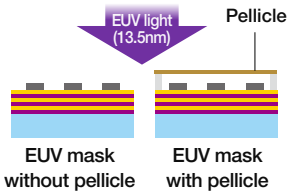
ACTIS A150

World's first 2019 Ten Best New Products Award

Actinic EUV Patterned Mask Inspection System

Adopting the 13.5nm light of EUV lithography for inspection to enable through-pellicle inspection and the detection of defects unique to EUV masks with high sensitivity

Patterned surface inspection

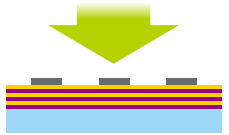


MATRICS X9ULTRA

Mask Inspection System

Inspecting both EUV masks and leading-edge DUV photomasks

Patterned surface inspection of EUV mask

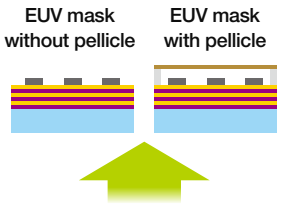


BASIC Series

EUV Mask Backside Inspection and Cleaning System

Inspecting the backside of EUV mask, measuring the height of particles and removing them

EUV mask backside inspection



Pellicle: Protective film designed to prevent patterned surface from being contaminated with particles

Lasertec is offering solutions to the customer's challenges by providing advanced inspection and measurement systems based on applied optical technologies, thereby contributing to society.