

Fraunhofer IAF

The Fraunhofer Institute for Applied Solid State Physics IAF is one of the leading research institutions in the fields of III-V semiconductors and synthetic diamond. Based on these materials, Fraunhofer IAF develops devices for future-oriented technologies, such as electronic circuits for innovative communication and mobility solutions, laser systems for spectroscopic real-time sensing, novel hardware components for quantum computers and quantum sensors for industrial applications.

Epitaxy and technology equipment as well as measurement technologies are available in a 1000 m² clean room, a 450 m² MOCVD hall and another 4000 m² of laboratory space. With its research and development work, the Freiburg research institute covers the entire value chain – from materials research, design and processing to the realization of modules, systems and demonstrators.

Our offer

Our epitaxy is characterized by outstanding quality and reproducibility. We can provide you with epitaxial layers according to your specifications for power and high-frequency electronic components as well as for semiconductor lasers, LEDs and detectors.



Contact

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Tailor-made solutions for III-V
semiconductors

Epitaxy on demand



Epitaxy on demand

We offer specially tailored solutions in the field of III-V semiconductor epitaxy. Thanks to state-of-the-art equipment, we are able to realize pilot series production of devices for power and high frequency electronics as well as for semiconductor lasers. In this way, we facilitate the transfer from research to industry.

Epitaxy equipment

- Single-wafer MBE development tools
- Multi-wafer MBE production tools for III-As/P and III-As/Sb
 - Capacity: 7 × 2", 5 × 3", 4 × 100 mm, 1 × 150 mm
- Multi-wafer MOCVD tool for III-As/P
 - Capacity: 6 × 2", 3 × 3", 1 × 100 mm
- Multi-wafer MOCVD tools for III-N
 - Capacity: 19 × 2", 12 × 100 mm, 3 × 200 mm

In the field of wafer epitaxy you can commission the following services from us:

- Epitaxy of customer-specific layer structures
- Epitaxy development and small series production
- Scientific advice
- Extensive characterization of the grown layer structures

Characterization

- Photoluminescence
- High-resolution X-ray (HRXRD)
- Secondary-ion mass spectrometry (SIMS)
- Atomic force microscopy (AFM)
- Sheet resistance mapping
- Optical surface detection mapping
- Bow and warp measurement
- Hall and CV measurement
- Reflectivity, transmission and absorption measurement
- REM, FIB, EDX
- Fabrication of test devices and full electro-optical characterization

In the following areas, we already offer products that have been developed using our epitaxial technology:

Laser structures (emission wavelength 750 nm to 12 μm)

- Diode lasers (GaAs 750–1080 nm, InP 1300–1700 nm and GaSb 1800–2400 nm)
- Quantum Cascade lasers
- VCSEL
- VECSEL

LEDs

- IR-LED
- UV-LED

Detectors

- Shortwave IR: InGaAs and extended InGaAs
- Mid- and longwave IR: Type-II-SL, QWIP
- UV Detectors

Electronics

- III-V based pHEMT, mHEMT
- Al(Ga)N HEMT on 100 mm SiC and 100 mm or 200 mm Si wafers
- HBT

SESAM

GaN-based templates

AlN-based templates

AlScN layers

...others on request

We are looking forward to hearing from you and will be happy to advise you!