Fraunhofer IISB

Fraunhofer Institute for Integrated Systems and Device Technology IISB

# SiC Materials

## Crystal and Wafer Analysis, Epitaxy and Functional Coatings

*SiC wafers in epitaxy and characterization lab © Daniel Karmann / Fraunhofer IISB*

## Joint Labs

Joint Labs offer industry the opportunity to collaborate with Fraunhofer IISB in form of cross-organizational development teams, which work together on the industry's key topics. This promotes a deeper understanding of the technology, which in turn facilitates technology transfer and accelerates integration into the product. To enable the team to work together successfully, premises are provided as well as the necessary technical infrastructure, in which the team members can work together on the problems and develop new technologies and products. The Joint Labs function also as a demo and application centers for newly developed tools and equipment.

We are currently running a Joint Lab for X-ray topography with Rigaku, a Joint Lab for SiC epitaxy with AIXTRON and a (U)WBG metrology Lab with Semilab. Moreover, we host a Joint Lab with Nippon Kornmeyer for functional coatings on graphite parts.

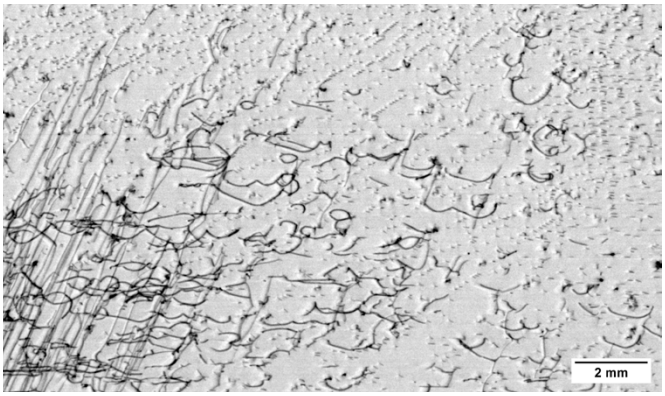
**40**
Years of Tech Excitement

## Features

- We are your competent partner for questions about research and development in the fields of semiconductor material production, material characterization, and the optimization of processes.
- Our key strengths are the correlation of process results (e.g. epi-layer quality) with crystal defects as well as the development of customer- and application-specific technical solutions.
- We bridge crystal growth and device manufacturing by aligning material properties with semiconductor process needs.

## Crystal and Wafer Analysis

- Full wafer substrate characterization: dislocation detection by XRT and etching, residual stress, wafer geometry and mechanical behavior
- Development of customized measurement routines
- Joint development of metrology solutions




*High-resolution x-ray topographic image showing different types of dislocations in 4H-SiC © Christian Kranert / Fraunhofer IISB*

## SiC Epitaxy

- n- and p-type service epitaxy on 4H-SiC wafers (150 mm, 200 mm)
- Characterization of epilayers with regards to defects (by UVPL, DIC, QUAD, µ-PCD, DLTS), thickness (FTIR), and doping (CV)
- Correlation of defects with device performance and reliability along the processing chain

*Next level (U)WBG metrology lab jointly operated with semilab © Daniel Karmann / Fraunhofer IISB*

## Functional Coatings

- Application of high-temperature protection coatings on graphite materials used in SiC processes (e.g. crystal growth, epitaxy, oxidation, etc.)
- Coating systems based on TaC (TACCOTA®) and SiC (SICCOTA®)
- Custom coating development and short feedback loops
- Delivery of test parts and application demonstrators

*Graphite components coated with TACCOTA® (top) and SICCOTA® (bottom) of different geometries and sizes for use in high-temperature processes. © Elisabeth Iglhaut / Fraunhofer IISB*

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